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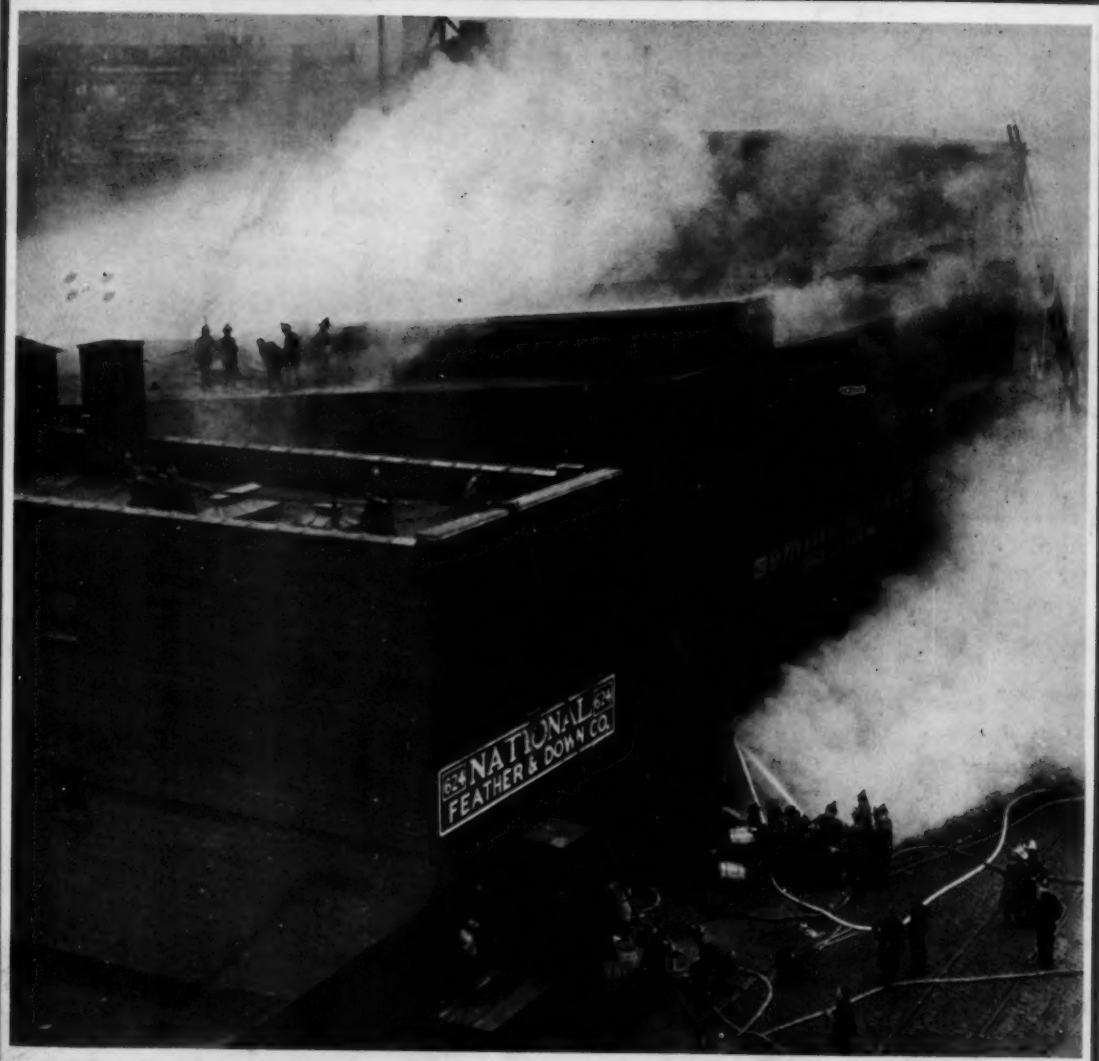
The Journal of the Fire Protection Profession

DECEMBER 23, 1931



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IN wishing our many friends a joyous Christmas, may we also express the fondest hope that it will not require any miracles in the New Year to carry you to the highest pinnacle of health, happiness and prosperity.

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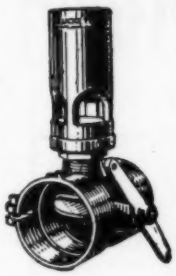

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(A Consolidation of Fire and Water Engineering and The Fire Engineer)

The Journal of the Fire Protection Profession

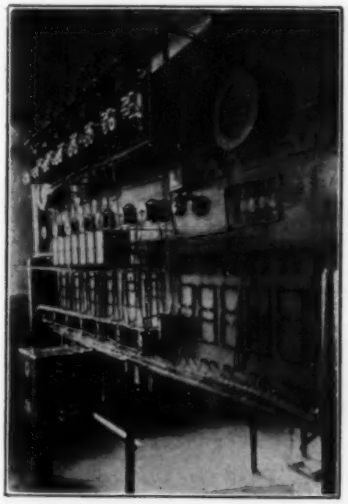
VOLUME LXXXIV DECEMBER 23, 1931 NUMBER 26

Rectifier-Floating-Battery Supply for Fire Alarm System

Description of System Employing a Single Group of Storage Battery Cells per Circuit, with Individual Rectifier Constantly Connected

By F. R. BRIDGES*

DURING the past few years there has been a decided tendency toward simplifying the power supply equipment of municipal fire alarm systems. Various schemes have been suggested and tried. Perhaps the one which holds the greatest promise is that employing a single group of storage-battery cells per circuit with an individual rectifier constantly connected. The following remarks are intended to cover the salient points of such an arrangement and to compare this scheme with other more or less accepted methods.



Rectifiers Offer the Same Economy in Battery Maintenance to the Small Fire Alarm System as to the Large

Here are shown six low and one high rate Gamewell rectifiers added to the back of an old storage battery switchboard at Woburn, Massachussetts.

Types of Rectifiers

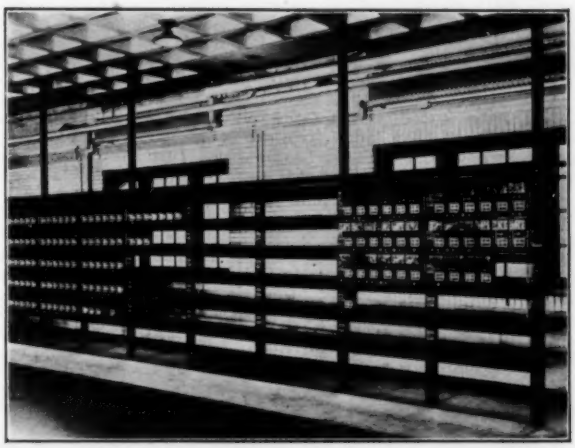
The primary type of rectifier is of course the ordinary commutator which is used on all direct current generators. The generator armature actually generates alternating current but the commutator by its contact arrangement converts or rectifies this into unidirectional current. The vibrating reed rectifier used in the early days of radio A battery charging, is in principle a commutator.

There is an almost endless variety of rectifiers. The silicon or galena crystal of our amateur radio days is a rectifier. The mercury arc for providing relatively large amounts of power has been used for many years. Recent developments with this type of rectifier have made possible installations of very large capacity, sufficient to replace the rotary converters in street railway substation service.

Then there are the electrolytic rectifiers as represented by the lead-aluminum cell and the more recent tantalum-lead-acid combination. It is usually believed that all electrolytic rectifiers entail the use of liquids. This is not so. There are several types of dry electrolytic rectifiers. There is a dry disc rectifier of an improved type on the market today which employs a coating of copper sulphide on a small disc or washer. This rectifier should not be confused with the copper-oxide disc rectifier. The copper sulphide unit has a definite life due to the decomposition of the active materials. The copper oxide type undergoes no chemical change and so far as is known at present has an unlimited life.

Perhaps the rectifier with which those concerned with the maintenance of small storage batteries are best acquainted is that employing a gas filled bulb. Tungars and Rectigon are examples. The mechanism of rectification in such a bulb is not the simplest to explain. Suffice it to say that one way conduction is achieved by gas ionization not directly by electron emission as in the hard vacuum type tubes employed in radio work such, for instance, as the UX 280 rectifier.

All of the foregoing types with the possible exception of the dry electrolytic rectifiers have to my knowledge been used in fire alarm signaling. The motor-generator has had the widest use as a battery charging rectifier. It has heretofore been only in small installations where a high first cost for motor genera-



George Fickett, Superintendent of Fire Alarm, Boston, Mass., Was One of the First to Install a Rectifier-Floating-Battery System.

Above is a view of the Gamewell rectifier installation at Boston—the largest now in operation.

*Engineer, the Gamewell Company.

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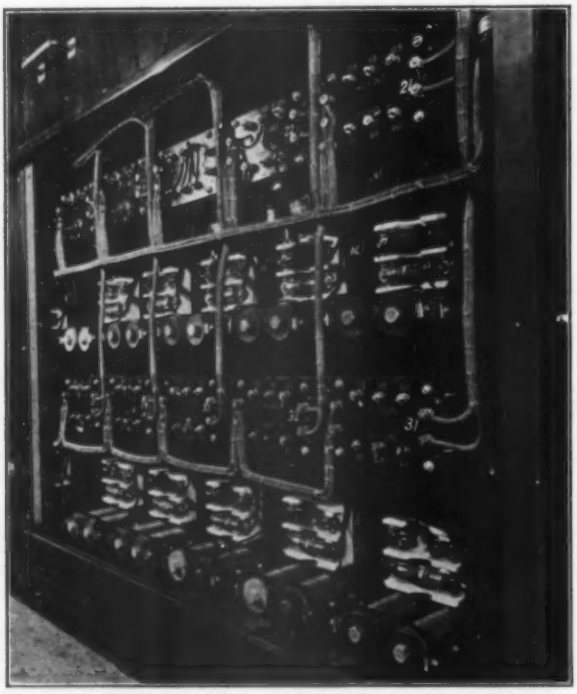
tor equipment was an important factor, that other types have found a place.

Development of Power Supply

Since fire alarm signaling outgrew its swaddling clothes and the various types of primary battery that went with them, the operating circuits have, except in several instances, received their supervising and operating energy from storage batteries arranged in groups of cells in series for each individual circuit. Whether this scheme was simply a hangover from the primary battery which by its inherently low output was capable of supplying but one circuit at a time or whether the evils of common battery were known and appreciated is not a matter of record. At any rate individual groups of storage battery cells have been the established standard. Storage batteries, of course, have to be re-charged since they cannot of themselves create electric energy. The logical arrangement then was to provide two groups of cells for each circuit so that the one set might be charged while its mate was supplying the line. As a general rule the individual groups of cells were connected in combinations of series and multiple to a single battery charging generator through protective relays and current controlling rheostats; protective relays to prevent the batteries from discharging



At Fort Worth, Texas, George Henderson, City Electrician, Was Able to Mount the Gamewell Rectifiers in the Lower Section of the Art. Metal Cabinets Holding the Storage Battery Switchboards. This Is the First Instance Where the Rectifiers Were Installed as a Part of a Complete New Central Office.

back through the generator or into each other in case of interruption of the primary power supply and controlling rheostats to limit the current supplied to rate suitable to the battery, time allowed for recharge, etc.

The extravagance of maintaining duplicate sets of storage battery for each circuit must have been appreciated almost immediately following its adoption. Schemes for supplying several circuits in multiple from a large common battery were tried in several of the larger cities but with few exceptions they have been discarded. The disadvantages outweighed the economies of lower first cost.

Another scheme which had its application principally in the larger cities was the use of an individual generator to supply current to each line. Usually dynamotors were used but in one city at least a multiple unit generator driven by a direct connected motor was used. Two or four generators each supplying a single circuit were connected to the common shaft. In the cases of the multiple generators and dynamotors the driving motors were connected in multiple to a large common battery which battery was itself maintained by one or more large A. C. to D. C. generating sets.

There are obvious disadvantages to such a system: the large number of rotating machines with high maintenance cost, the inflexibility inasmuch as the generator delivery voltage especially in the case of the dynamotors is fixed within a narrow range and, more serious than the others perhaps, the inconvenience and loss of service time incident to clearing the line from a defective machine and transferring to the hospital equipment. To overcome this last disadvantage in one instance at least, namely, the West Philadelphia Station, a bank of storage battery is connected in multiple with the line and the dynamotor. The input to the battery is adjusted to replace losses due to local action in the cells. Protective relays are required to prevent reversal of power in case of primary service interruption.

This installation was not the first, however, to employ so-called floating batteries. The Gamewell Company have for at least fifteen years supplied a complete rectifier-floating battery system for small towns. In most cases the rectifier was of the gas filled bulb type (Tungar or Rectigon). This equipment has been extremely satisfactory. Dependable maintenance which is at a premium in the smaller towns is practically eliminated but the rectifier is simply a stock article from the open market and as such naturally does not fit the job exactly. Bulb burnouts are quite frequent and operating efficiency is low.

Application of Copper Oxide Rectifier to Fire Alarm System

A good rectifier was needed to make the floating battery scheme really workable. Such a rectifier should have no moving parts, should have long life, high efficiency and ability to withstand the effects of short circuits and line disturbances from both the fire alarm circuit and the power supply circuit. A primary requirement for a rectifier for fire alarm service is flexibility to adapt itself to the varying circuit voltages in order that a single interchangeable type can be used throughout the installation.

About five years ago there was put on the market by an electrical manufacturer a small general purpose rectifier employing a new principle, the rectifying action of a thin layer of copper oxide. This rectifier was investigated by the Gamewell Company and as a result the first rectifier, designed exclusively for fire alarm use, was developed. A series of exhaustive tests followed. The finished rectifier met the previously stated requirements with a wide margin. There were no moving parts, no acids, no bulbs, in fact nothing to deteriorate. Life tests on the rectifying unit itself indicated unlimited life. The unit had three taps on the output side, 30-45-60 volts. By proper tap selection a circuit and battery of any voltage between 15 and 85 could be supplied. The unit was practically foolproof; on its highest tap it would stand continuous short circuit and even though a 15-volt battery were connected to the 60-volt tap, the charge to the battery was not seriously increased. No rheostats or movable contact devices were used to obtain this remarkable flexibility.

Initial Installation Made at Providence

Rectifiers of this type were installed by the city of Providence, R. I., after a complete investigation by its engineers. Seventy-two rectifiers have been in service there since June, 1930, without a single failure or any indication of deterioration. Since the initial installation at Providence, installations have been made at Vancouver, B. C., Boston, Mass., Fort Worth, Tex., and many others totaling approximately 450 units now in operation.

This rectifier is particularly suited to adaption to existing systems. It is very compact and need not be located close to the switchboard. Some rewiring of existing boards is of course necessary.

The special rectifier is suitable for delivering a low rate as required for floating service. It does not have capacity for charging batteries at full rate. In a complete rectifier installation it is common practice to supply one high rate rectifier to each ten low rate circuits for the purpose of giving the batteries an overcharge or for quickly replacing the energy used from the battery incident to a primary power interruption. On remodeling jobs it is possible to retain the present motor generator set for this purpose on storage battery switchboards previously arranged for charging each circuit individually.

This rectifier was designed particularly for use with the 6-ampere hour lead-acid storage battery which has been the standard fire alarm cell for many years. It is not limited to service with this battery and can be used with any cell so long as the total output of the rectifier does not exceed a safe maximum. The rectifier output should be adjusted so that a terminal voltage of 2.15 volts per cell is maintained; observations being

(*Continued on page* 978)

Opinions of Higher Courts

Involving Employment of Municipal Firemen

Employment Must be Directly or Indirectly Authorized by State Law or Municipal Ordinance—Definition as to Term "Veteran"

By LEO T. PARKER, Attorney-at-Law

IT is well established that a contract under which a member of a municipal Fire Department is employed is void, unless the contract is directly or indirectly authorized by a valid state law or city ordinance.

Therefore, the Court will not direct a municipal Mayor, or other city official, to appoint any person as fireman when in fact such official has no legal authority to make the appointment. This is true although the lack of proper authority is the result of inefficiency or negligence of another official.

For instance, in Gamm vs. City of Covington, 33 S. W. (2d) 697, an applicant named Gamm filed suit to have the Court direct that the civil service examiners of a city certify his name to the Mayor and Commissioners as eligible for appointment as a city fireman, and to compel the latter officers to appoint him as such.

During the trial Gamm introduced testimony showing that a city ordinance provided:

"The Board of Examiners shall grade each applicant examined, on each subject, and no applicant shall be placed on an eligible list unless he shall have received a general average of not less than 75 out of a possible 100. The Board of Examiners shall place all applicants examined for positions in the Fire Department, who have successfully passed the examination as provided for herein, on separate eligible lists, and shall certify same to the Board of Commissioners of the city. . . ."

Gamm proved that he had made a general average of 76½ on an examination taken before the civil service board, and that his name was third on the list. His "mental average" was given as 76½, but under the caption "Physical Condition," was the word "insubordination."

Charging that this report was unauthorized, Gamm contended that the board of examiners should correctly certify the result of his examination, and that he should be reported in good physical condition.

Gamm also argued that since taking the examination, and thereby establishing his qualification and eligibility, the City Commissioners had appointed another person having a lower grade than he to a place as fireman, to which appointment he was entitled under the statute and ordinance, and that the Mayor and Commissioners had refused and were refusing so to appoint him. He requested the Court to direct the Mayor and City Commissioners to appoint him fireman. It is interesting to observe that the Court refused to do so, saying:

"It is clear that the Board of Examiners has not complied with the terms of the ordinance in making a report to the City Commissioners of the results of the appellant's examination. He has the right to have that mandatory ministerial duty performed. . . . The Board of Commissioners is an executive or administrative body in so far as their duties are concerned in making the appointments under the provisions of the ordinance. . . . Within the terms of the statute and ordinance, prescribing qualifications of applicants for appointments, they may exercise a reasonable discretion. In the absence of a disclosure of arbitrary and unreasonable abuse of that discretion, the Courts may not interfere. . . . There was no report made to them respecting the appellant's qualifications as is required, and a mandatory order will not be granted in anticipation of an omission of duty. . . . The plaintiff was not entitled to the relief sought against that body."

SUBJECTS TREATED IN THIS ARTICLE:

- Contract of Employment Void Unless Authorized by State Law or Municipal Ordinance
- Acceptance of Payment by Employee Bars Future Rights to Sue
- Order for Fireman's Removal Held Valid
- Civil Service Employee Must Prove Capability
- Definition of the Term "Veteran"
- Discharge of Civil Service Employee Held Illegal
- Liability of Municipality for Discharging Fireman
- Personal Liability of Public Officials

Acceptance of Payment Bars Future Rights

Frequently the higher Courts have held that any person who accepts payment, without complaint, thereby indicates that he is satisfied with the amount of money received and cannot at a later date file suit and recover additional payment. This is particularly true if no testimony is introduced showing that the municipality positively agreed to make the additional payment for which suit is filed.

For example, in the late case of McConaghy vs. City of Philadelphia, 153 Atl. 334, it was disclosed that a state law provides for the division of battalion chiefs, and others of the uniformed fire forces, into two bodies or platoons, and that "every such body shall perform service alternately every twenty-four hours, commencing at eight o'clock in the morning and ending at eight o'clock the following morning, and in no case shall any such officer of such fire force be required to serve continuously for more than twenty-four hours" except in emergency cases.

The Council of the city failed to enact an ordinance to put the provisions of this state statute in force, nor were additional appropriations made by the Council to meet the increased expenses necessary to compensate employes embraced within its terms.

In the meantime, a battalion chief named McConaghy remained in the employ of the city and continued to discharge his regular duties as such officer, as he had done previous to the passage of the state law. He received compensation in accordance with an old ordinance which fixed the pay of officers of his rank in the Fire Department.

After a period of three years had expired, since the enaction of the state law, McConaghy filed suit against the city to recover additional payment of salary based upon the new law. However, since McConaghy had accepted payment from the city without complaint, the Court held that he was not entitled to recover the payment specified by the law, and said:

"The record fails to show that McConaghy was dissatisfied with the sum allowed for his services or the time required to be on duty under the ordinances and rules of the department in force during the time for which additional pay is now claimed, or that he made demand of the proper municipal officers for either increased pay or decreased working hours before instituting this action. Under the circumstances indicated above, plaintiff (McConaghy) is not entitled to recover additional compensation to that heretofore paid and accepted by him."

Order of Removal Held Valid

The most important consideration in all cases involving

the authority of City Managers, to suspend members of municipal Fire Departments is whether or not the city manager violated a state law, the city charter, or a municipal ordinance. The latest higher Court case involving this important point of the law is Sevina vs. Hickok, 298 Pac. 116.

The facts of this case are that a city enacted an ordinance which purported to grant the right of retirement on pension to certain members of the Fire Department if "removed from said Fire Department for any cause other than conviction of a felony; notorious or consecutive insubordination or neglect of duty." The City Manager has power under the city charter to remove department members without a charge and without hearing. The pension board has authority under a city ordinance to grant or deny a pension under certain conditions, and is the only body authorized under the charter or ordinance to determine whether or not an applicant is entitled to receive a pension.

A member of the department was indicted by the federal grand jury for conspiracy to violate the federal Prohibition Act. Pending his trial in the Federal Court he was duly suspended from office by order of the Chief and City Manager. Following his acquittal in the Federal Court he was removed from office by the City Manager. The order of removal recited that the cause of such removal was "notorious and consecutive insubordination and neglect of duty."

The employee applied to the Pension Board of the city to be retired upon a pension under the terms of the so-called "Pension Ordinance" of the city. The application, after a hearing conducted by the pension board, was denied. The employee then filed suit to compel the pension board to allow the pension.

During the trial it was conceded that the department of the city was not under civil service and that the City Manager had full power to suspend and remove a member of that department with or without cause.

Therefore, since it was not proved that the Pension Board acted arbitrarily in refusing to grant the pension, the higher Court held the employee not entitled to a favorable verdict, and said:

"To have any standing in this proceeding it was incumbent upon petitioner (employee) to plead and prove that the pension board acted arbitrarily, capriciously, or fraudulently, or that in some other respect the proceeding before the pension board was conducted without due regard for the rights of the petitioner."

Civil Service Employee Must Prove Capability

While it is well established that a state law is valid by the terms of which veterans are given preference over other applicants, yet the legal interpretation of the law is not that an incapable veteran may receive and hold an appointment.

For illustration, in Canty vs. City Council of Lawrence, 175 N. E. 481, it was disclosed that a veteran of the World War was discharged from municipal employment. He appealed to the Court on the grounds that his discharge was illegal. During the trial it was shown that a state law gave preference to ex-service men for civil service positions. Also, another law provided:

"In towns in which the provisions of the above mentioned law and the rules governing the civil service have not been applied, the Selectmen and the City Councils shall take any necessary action to secure the employment of veterans in the labor service of their respective cities and towns in preference to all other persons except women."

Since the veteran did not prove that he was sufficiently capable to hold the position, the higher Court refused to order his reinstatement, and said:

"Even in the case of veterans classified in the civil service the Court . . . has said that this statute gives them no absolute and unconditional preference over others for appointment to the public service. Veterans must establish their qualification to perform the required duties in the same way as all other applicants or candidates by passing the examinations conducted under the direction of the civil service laws before they can be considered for preferential certification. . . . Upon this record no rights of the petitioner (employe) were violated in his dismissal without a statement of the reasons therefor . . . nor in the action of the City Council in connection with the hearing accorded him, nor in their failure to reinstate him after hearing."

Definition of a Veteran

Numerous states have enacted laws granting special privileges to "veterans." Therefore, the legal definition of this term is important. The higher Court in the late case of Scott vs. Commissioner of Civil Service, 172 N. E. 218, defined this term.

In this case it was shown that a state law was adjudicated which authorized the Civil Service Commission to grant certain privileges to veterans, such as giving preference to a "veteran" applicant to a Fire Department position.

An applicant, who was refused an appointment as a municipal firemen, sued the Commissioner of Civil Service to compel him to place his name on the list of applicants upon the ground that he was a "veteran." However, it was disclosed that the applicant was sworn into the service as a soldier on November 13, 1918, two days after the Armistice in the World War was signed. Although the applicant served for several months, the higher Court refused to grant special privileges to the applicant, saying:

"All warfare ceased when the Armistice was signed and hostilities were not thereafter renewed. We are of the opinion that, so far as this statute is concerned, the war was then at an end. It is common knowledge that upon the signing of the Armistice the war was actually at an end, and was so regarded by everyone. It cannot rightly be held that it was still in existence after November 11, 1918."

Discharge of Civil Service Employee Held Illegal

Various Courts have held that a municipal fireman, employed under a valid civil service law, cannot be discharged without just cause, or in accordance with the laws. So held a higher Court in Rodgers vs. Board of Public Works, 281 Pac. 64.

The facts of this case are that without a legal reason a Commission adopted a rule which required civil service employees to have been employed with the municipality at least one year before being entitled to reappointment after being temporarily suspended from the service.

An employee who was laid off on account of lack of salary funds filed suit to compel the Commission to pay his salary during the lay off period and to reinstate him. The higher Court rendered a decision in favor of the employee, saying:

"The Commission had no power to adopt a rule requiring service for one year before an employee is entitled to be returned to his position after a 'lay off'. . . . It has been expressly found that the permanent position of the employee was maintained during the time involved in this controversy, that the employee's appointment was to a permanent position, and that he had served in such position for over six months."

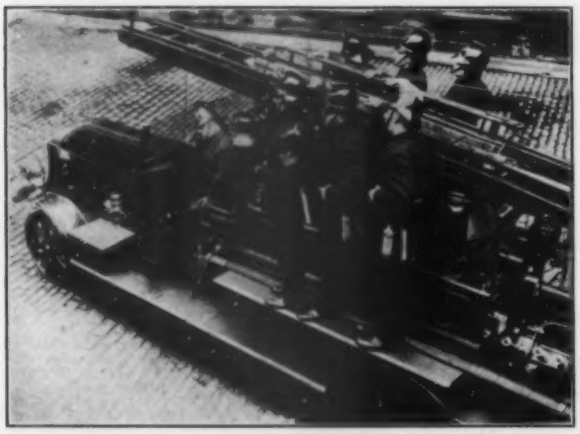
Liability of Municipality for Discharging Fireman

The higher Courts in certain states, except in California, Pennsylvania, Maine and Tennessee have rendered decisions holding that a municipality is not liable for wrongful discharge of a municipal fireman. A recent case involving this point of the law is Gallagher vs. Kansas, 7 S. W. (2d) 357.

In this case it was disclosed that a fireman sued the city to recover damages for wrongful discharge by the Board of Fire Commissioners. This Court promptly refused to hold the city liable, saying:

"The Board of Fire Commissioners, as well as all other

(*Continued on page* 980)



London Fire Apparatus Equipped With Radio

Radio has now been made a part of fire apparatus equipment in London. The aerial on this apparatus is carried parallel with the ladders. The officer seated in the front is carrying on a conversation with headquarters. It is claimed that the radio will reduce the time necessary to bring extra fire companies or an ambulance, and that it will facilitate the movement of companies from one fire to another.

The Volunteer Fire Department

By N. N. WOLPERT,
Assistant Editor, FIRE ENGINEERING

A Series of Articles on Volunteer Fire Department Administration and Operation.

Fire Department Tools and Their Use—Types of Nozzles

This article, the sixteenth of a series, continues the description of some of the more common Fire Department appliances and their use, and in particular, treats of the various types of nozzles.

WHILE very few members of an engine company are qualified to operate the pumper, each one should have a good knowledge of the various types of nozzles that are carried on the pumper and also the special types of nozzles that may be found in the station.

The character of the fire stream depends to a great extent upon the nozzle. Nozzles must be made to exactly the right proportions, and must be finished smooth if satisfactory fire streams are to result. Any deep scratch or nick on the interior surface of the nozzle will result in the formation of eddies, scattering of water, or in added friction losses.

Nozzles are made to attach directly to the hose to playpipes. In the case of the play pipe, after the stream passes through 2½-, 3-, or 3½-inch hose, the stream is reduced in diameter to about 1½ inches by the play pipe. The nozzle tip carries the reduction further to the size that is desired. In order to obtain the best possible stream, it is necessary to reduce the size of the stream of water as it leaves the hose so that the greatest velocity of water will result. This is so the stream will acquire a good propelling force, and at the same time obstruct the flow of water as little as possible. At one time it was thought that by choking the stream down at the tip of the nozzle that the best stream could be secured. But since then, it has been proven that the theory was established without foundation of facts.

At the present time, nozzles are so shaped that the stream after leaving the play pipe, or where a nozzle is attached directly to the hose, the diameter of the nozzle, from the point where it leaves the hose is gradually reduced until a point from one to two inches from the outlet. From this point, the nozzle is practically cylindrical. The length of the cylindrical part is about equal to the diameter of the bore. The object of this short cylindrical section is to round out the stream previous to its discharge. Theoretically, this cylindrical part retards the flow and diminishes the velocity of the stream. Practically, it has been found that the stream from a perfectly tapered nozzle breaks up very soon after reaching the air. The small streams of water coming down the inside of a fully tapered surface of the nozzle, cross each other a short distance from the outlet.

Single Roller Control Nozzle

Slight deviations in the shape of the nozzle have a decided influence in the character of the stream. Tests carried out by competent engineers show that it is hard to detect the difference in streams from nozzles in which the sides curve at different degrees of curvature as long as the tip is not choked or equipped with rings, or built other than true cylindrical in shape right at the tip.

Play pipes that have narrow throats reduce the effective range of the stream from five to eight per cent and they create an added amount of spray. This is probably due to the friction in the narrow throat. Play pipes with rough interiors, that is where the inside is not polished but left in the condition as taken from the mold, lose in range as much as thirty per cent. But in such a case, the drops of water in the spray are very large. The reason for this has not been determined, but it should be borne in mind that these large drops of water are more effective in distinguishing fires than the fire spray, for they have a better chance of penetrating a fire and getting down to the burning material instead of being vaporized, as in the case of fine spray.

For a long time it was thought that the spray in nozzles was due to the whirling motion of the water alone. Careful experiments have shown that this is not the case. There is, however, a whirling motion in the water, particularly in the case of siamese connections near the nozzle, or in the case where the hose is "corkscrewed" near the nozzle. It is the whirling motion which breaks up the stream due to the centrifugal force of the whirling drops. In such cases the vanes placed in the playpipe or nozzle will go a long way toward removing the whirl. Where the line of hose leads straight up the nozzle, or leads up with a smooth curve to the nozzle, and there is no twisting effect, then the vanes are not needed.

Double Roller Valve

Two common types of vanes are found in nozzles. The more common type of vane is so constructed that it divides the cross sectional area into four equal parts. Another type of vane which was formerly used but which is going out of use, was attached to the side walls of the nozzle and projected about one-quarter way out into the waterway. In this instance, the center of the stream was not at all affected by the vane but only the parts of the stream around the surface of the nozzle.

The play pipe is also provided with a stick as a means of overcoming the nozzle reaction when a large stream is used at high pressure. The rod is attached to the body of the pipe and it projects backward along the line of hose about three feet. The point of the stick or rod is set in the ground or pavement and it not only assists the men in operating the nozzle to overcome the nozzle reaction, but it also provides an easy means for moving the stream from side to side.

A study of the reaction of a nozzle on a 2½-inch line expressed in pounds resulted in the following formula for the reaction where a shutoff nozzle is opened quickly:

$$\text{Reaction in pounds} = 1.8 \times d \times d \times p$$

where d equals the diameter of the nozzle in inches and p equals the pressure in pounds.

For the simple reaction of a nozzle on a line:

$$\text{Reaction in pounds} = 1.5 \times d \times d \times p$$

In the use of controlling nozzles, the chief precaution to observe is that the nozzle is slowly opened while under pressure and that it is closed slowly while under pressure. If a line of hose is under high pressure, and the nozzle is opened quickly, the line may whip away and do serious damage before it is controlled. On the other hand, if a stream is flowing through a line and the nozzle on the end is shut quickly, water hammer or ram will develop, and this may burst the hose, blow off a coupling or do other serious damage. The proper use of controlling nozzles will result in a great saving of water loss, but, as noted above, precautions in the use of nozzles must be exercised.

Controlling Nozzles

Controlling nozzles, as commonly found, are made in two styles—the single roller valve and the double roller valve.

The single roller valve type of shut off nozzle is the simplest. To shut off the flow of water, it is only necessary to pull the handle backward. This turns the roller around

and thereby blocks the flow of water through the nozzle. If the handle should be pulled downward, then the valve passage would run from left to right across the nozzle and would present a blind surface to both the tip of the nozzle and the hose connection end.

In the other type, each roller is notched with a semi-circular channel and when these two rollers are rotated, the two separate channels come together to form the bore of the nozzle. One of the valves is usually operated by the other through the medium of gears.

Most departments are equipped with 1½, 1, and ¾-inch controlling nozzles.

For small fires, particularly in tenement or residential districts, the ¾-inch or the smaller tips are used. For inside work, 1½-inch controlling nozzles are never used, but this size can be used on 3-inch hose for outside operations.

Ordinarily the first line of hose for inside work is equipped with a 1¼ or 1½-inch controlling nozzle. The proper use of controlling nozzles may result in the saving of considerable property from needless water damage. However, care must be observed in the use of these shut-off nozzles to prevent the bursting of hose as the result of water hammer.

When a shut-off nozzle on a line of hose is closed while the water is flowing, the velocity of the water is retarded as the shut-off is closed. What is known as a dynamic pressure is product. When the shut-off is closed too rapidly, this pressure may be many times as great as the pressure under which the line was operating, and it is then called "water hammer" or "ram." Hose has often been known to burst from this cause.

Action of Water Hammer

Just what the water hammer may amount to in a line of hose depends upon the construction of the hose and the rapidity with which the shut-off is closed. The greatest pressure is created if the value is shut off instantly. The pressure is less where the valve is closed gradually. A rough rule for determining the pressure created by closing the valve instantly on inflexible carriers is that the pressure equals five times the velocity of the water in the hose, measured in inches per second.

Where the nozzle pressure is 100 pounds and an 1⅛-inch nozzle is used, the maximum pressure produced by instantly closing the hose will be 1,540 pounds per square inch. For a 1¼-inch nozzle this will be 1,900 pounds. Where the pressure is fifty pounds at the nozzle, and a 1⅛-inch tip is used, quickly closing the shut-off will result in a pressure of 1,090 pounds per square inch. For the same pressure with a 1¼-inch nozzle, the pressure will be 1,345 pounds.

The figures given are for the instant closing of the shut-off. But this is actually impossible for some definite time must pass in changing the shut-off handle from one position to the other. Therefore, the actual pressure created would be less than the computed pressure. These figures should therefore be taken as maximum values.

Haley Nozzle

As controlling nozzles when fully opened have a full waterway from end to end, the discharge from these nozzles may be calculated with the same formulas and with the same accuracy as with plain nozzles. This applies to controlling nozzles of the ordinary type, but it does not apply to controlling nozzles equipped with rings in their ends.

In the case of ring nozzles the discharge would be appreciably less than with smooth bore nozzles. The ring cuts off about ⅛-inch all around from the bore diameter of a plain nozzle.

To sum up, controlling nozzles should be used on all inside work, the diameter of the nozzle depending upon the work to be done.

For very small fires, the ⅞-inch tip is satisfactory, while for larger interior fires, the 1¼-inch nozzle is needed. For outside fires, 1¼ and 1½-inch controlling nozzles are most desirable, when controlling nozzles can be used to advantage.

On opening the nozzle, particularly where long lines of hose are used, open the nozzle very slowly so that in case the pressure has crept up in the line of hose while the water was standing still, no damage will be done by the stream whipping around, after it is opened up under the excess pressure.

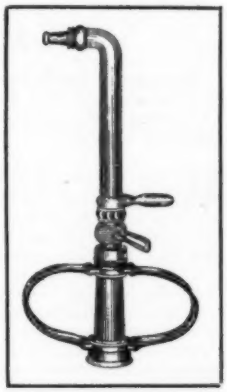
The nozzle has the advantage over the ordinary controlling nozzle in that it provides a means of changing the size of the stream, in addition to completely shutting it off.

The Haley Nozzle

The Haley nozzle weighs about 4½ pounds, and delivers streams from 1¼-inch down. The smallest size stream employed is usually ¼-inch. A change in the size of the stream is secured by turning a sleeve on the nozzle, either to the right or left.

New York Bent Nozzle

The New York bent nozzle, while not very extensively used, is rapidly finding favor. It is particularly effective for handling fires in partitions, ceilings, cornices and other small, confined spaces. Its chief advantage lies in its convenience, for it can be handled easily and placed in small apertures which would not accommodate other types of pipes. In addition to this, the nozzle is equipped with a handle and swivel so that the pipe can be rotated, giving it a complete circle of range. The nozzle is usually attached to a shut-off in place of the ordinary tip, and thus it can be used, not only effectively from the standpoint of extinguishing fires, but the control of water in it is also good. The stream can be shut off when not needed, and unnecessary water damage can be prevented. Another advantage is that it can be placed as a shut-off nozzle without shutting down the line. It is only necessary to close the shut-off nozzle, remove the ordinary tip, replace it with the bent nozzle, and then open up the shut-off.



N. Y. Bent Nozzle

The deluge set is used for fighting fires that have made considerable headway and where it is necessary to deliver powerful streams from points a considerable distance from the fire. Deluge sets make it possible to throw large streams at high pressures and to relieve the firemen of the dangerous and difficult job of holding the nozzle. The sets, as usually constructed, consist of the pipe holder and the nozzle attached to a short length of large diameter hose. On the other end of this hose is a siamese fitting. Deluge sets are commonly found with 3½-inch hose, with two or three-way siamese connections, or a four-way siamese having 2½-inch inlets and a 4-inch outlet and a section of 4-inch hose leading from the four-way to the nozzle.

The siamese fittings are of the clapper valve type so that in the event that one of the lines bursts, or one of the lines is thrown out of service for some reason, the set will still be in service. The water enters through the good side and backs up against the side of the clapper valve where the line is out of service. The clapper valve of the bad line is thus seated and there is no loss of water from the siamese.

Open nozzles and short pipes are the same. They are usually made of bronze, properly tapered, and may or may not have removable tips.

Play Pipes and Chemical Nozzles

Play pipes are generally distinguished from open nozzles by their lengths. There are a great number of play pipes on the market varying from the long brass pipe to the shorter pipe with handles attached. Play pipes usually have detachable tips so that different sizes of streams can be secured by use of the different sizes of tips.

Various types of chemical nozzles are found in service. Some of them operate on the shut-off valve principle while others have a special valve operated by a small handle. Chemical nozzles are usually made to attach to ¾ or 1 inch chemical hose.

There are several styles of spray tips on the market where it is desired to cool down a large area such as the surface of a pile of shavings or an oil tank.

Hart and Baker Cellar Pipes

Where men cannot operate in cellars because of smoke, heat or obstructions, the Hart or the Baker cellar pipes are used. Both of these pipes operate in a similar manner—they are inserted in holes cut in the floor or roof or wherever used. The range of stream from a cellar pipe is less than that

(Continued on page 979)

THE ROUND TABLE

For Practical Discussion of Current Fire Department and Fire Management Problems

Handling High Tension Wires at the Fire Grounds

HIGH tension wires at a fire are a source of great annoyance to efficient operation at a fire, and of great personal danger to the firemen and to the thrill-seekers who always assemble to watch firemen work. In addition overhead wires form a line for fire in traveling from one building to another.

High tension wires are not uncommon to the Fire Department officer. He knows that unless some procedure is established to cope with such conditions, the department will be delayed in its operations and the men will be exposed to needless dangers.

The problem in full that is treated in this issue, appears in the box on this page. In the box on the following page is the question that will be treated in the next issue. Should you have some comments that you would like to add to the next discussion, you are invited to write to the "Round Table Editor," FIRE ENGINEERING, 24 W. 40th St., New York, N. Y.

HERE IS THE PROBLEM

What procedure do you follow when you discover that you are hampered by high tension wires at a fire?

What method do you follow when you are faced with a broken overhead wire at a fire?

What suggestions have you for improving the cooperation between the Fire Department and the power company for service at fires.

Discussion of the Question

To avoid any possible delay in working at a fire, most Chiefs have provided linesmen's tools so that firemen who are trained in this work, may cut any wires that form an obstruction. As a general rule, Power Companies respond to fire alarms as a regular procedure or they respond in answer to a request made by a commanding officer. The replies that have been received follow:

A. McC. Marsh, Chief, Columbia, S. C.: Whenever we are confronted with high tension wires at fires and the wires apparently have fused so that there are two pieces hanging, we first caution our men to watch out for these wires. Then the Power Company, which maintains a truck, manned by two men and on duty at all times for emergency purposes, is notified. Should the wires fall before the arrival of the power company crew, we are prepared to handle the situation. We have wire cutters, with heavy insulated rubber handles attached. When using these wire cutters, our man is required to put on rubber gloves and on top of these rubber gloves, a pair of heavy leather gloves. He then "clips" the wire off.

When the wires carry large high tension charges, we back our truck up close to the wire, being careful not to touch it, one of the men stands in the truck and "clips" the wire. If a dry board or piece of dry timber is available this is used for the man to stand on. By carrying out this procedure we have never had a man hurt.

Several things must be taken into consideration when faced with a broken overhead wire at a fire. If the fire is in the business district and the Power Company has sent its truck and crew, we have no cause to worry for the Power Company always removes such wires. In a few instances, we have had to assist in removing wires and in doing so, we use our aerial ladder so our men can "rope the wire." Every one participating in this work is required to wear rubber gloves with a pair of leather ones over them. Our men are especially cautioned not to let the rope, in any way, come in contact with his body. In some cases, we are able to push wires off with long pike poles. These pike poles are always handled with rubber gloves.

I have the assistance of the Power Company 100%. I feel that the cooperation between the Fire Department and the power company could not be improved. The services of this company are at my disposal whenever fire occurs in the city. The Power Company never interferes with nor removes any wires until they have gotten in touch with me. If a second alarm comes in and the fire is in the business district of the city, all crews employed by the Power Company are called in and are sent to the fire to work in conjunction with the emergency crew.

On several occasions I have requested the power company to "cut off" the current when fires were in our business district and when there was danger of walls falling with high powered wires in close proximity. In every instance, my requests to the Power Company were immediately carried out and effected in less than three minutes from the time I notified them. We wish to say that we have never had any serious accidents from "live wires" when fighting fires, in our department.

Rubber gloves used for handling electric wires should be tested regularly. A splendid way to test a glove is to place the fingers into a bucket of water, then starting at the mouth of the glove, begin to roll it and you can easily detect any holes. Never try to patch a glove—always replace with new ones.

Thos. F. Dougherty, Acting Chief, New York, N. Y.: Only on rare occasions do we meet with a high tension wire. Whenever it interferes with our operations, we do not hesitate in cutting it, but where speedy action might be taken by an employee in a railroad yard or other place, we would, if it were possible to do so, request that the current be cut off from the section involved.

When wires are broken overhead, to guard the men against them they are cut off close to the support on each side of the break.

In this city an employee of the electric light and power companies always responds to an alarm of fire, and he always complies with any request we make. I would suggest that this be done in every locality.

Henry R. Taff, Chief, Norwich, Conn.: When fighting a fire in our city where high tension wires hamper working conditions the word is passed along to use precaution in directing streams into the burning building. We then get word to the emergency lineman, who responds to all alarms of fire, just what we want done in the way of making conditions safe for the men to proceed in fighting the fire.

If he can perform that duty he will, and if not he immediately calls up the Power Company, and informs them of the situation and the power is shut off the lines.

We are often called to take care of a wire that has broken and has fallen to the ground. The first thing we do is to call the Power Company informing them about the location of the broken wire. If the fire company arrives at the scene ahead of the power company, and the wire is sputtering and arcing we do not meddle with it, but just keep the people away from it until the lineman arrives. He takes care of the trouble and is often assisted by the firemen. If we cannot get any lineman from the power company, of course we try and cut the wire off within a few feet of the top of the pole, so no one can reach it. We carry insulated wire cutters especially for this work.

The Fire Department has wonderful cooperation from our local power company at all fires. All power companies should extend every cooperation, as by doing so they are protecting their property.

Daniel Mosher, Chief, Dunkirk, N. Y.: When we are hampered by high tension wires at a fire, and the fire is of any size, the wire department immediately follows. I caution every man to stay away if there is any danger of wires coming down.

Some time ago we settled that the power company was responsible for the wires and they have seen fit that it is their special duty to cooperate with the Fire Department in this, and we do likewise in our duties to them. So must say they are always on the "job."

H. E. Nissen, Chief, Winston Salem, N. C.: When hampered by high tension wires, we either cut them down, or order the switch opened at Power Stations.

We have an experienced electric lineman who responds to all fire alarms coming from commercial and manufacturing districts.

When faced with a broken overhead wire at a fire, we sometimes get a rope on the loose ends and pull the wire clear. When broken wires are not entangled, or are not likely to become so, we cut at the poles and drop wires to the street.

A tapper gong connected with the fire alarm system has been installed in office of Power Company Line foreman and when an alarm is transmitted from commercial or manufacturing districts, a line crew is immediately dispatched to this location.

W. F. Woehler, Chief, Akron, Ohio: Always when we have a fire in the down town or mercantile districts or any other section of the city where we will be hampered by high tension or overhead wires, the Power Company is notified and they cooperate by sending about six linemen to remove any wires that are in our way. This line gang remain at the fire until the fire is out or under control.

We have always had good cooperation from our Power Company, and in return give them good cooperation by removing fire hose from street car tracks as soon as possible when the fire is under control.

W. L. Ryan, Chief, Dubuque, Iowa: The first move in the procedure followed when hampered by high tension wires is to notify the power company, identifying our department and giving the exact location of the street intersection where high tension wires are giving trouble. The power company immediately "kills" the circuit and sends an electrician out to check the trouble. This man remains on the job cutting wires if necessary, and he does not leave without first reporting to the officer-in-charge at the fire and receiving his permission.

Our fire alarm department is composed of three expert electricians who respond to all important fires. These men are capable of taking care of any trouble until the arrival of help from the Power Company.

The methods here have worked out very satisfactorily. Our fire alarm operators notify the power company of all second and general alarms of fire; the power company officer in charge of the fire, after which he notifies the dispatches a line crew to fire; the foreman reports to the engineer at the power plant to kill any high tension circuit that may give trouble.

We have found our local power officials very willing to co-operate with our department and we have endeavored to give them all the necessary cooperation in return. The fact that the Fire Department and the Power Company are both serving the public requires friendly cooperation between both departments in order that the service of both may be satisfactory. I believe that the best way to go about this is to have the officials of both departments get together and work out a plan best suited to their individual needs.

W. A. Easom, Chief, Laurel, Del.: Both of our fire engines are equipped with linesman's tools. The manager of the Public Service Co., who owns and operates the electric plant, and two of his assistants or "trouble men," are members of our department and they are notified immediately of all fires. The Chief of Police of this town is a member and he makes it a point to attend all fires not as a fire-fighter but to protect the territory in which the fire is burning.

In the past we have been detained and troubled by these high tension wires, also by crowds in the way of our firemen, but the method now followed does away with these interferences.

James A. Schooley, Chief, Medina, N. Y.: The first thing we do when faced with high tension wires is to call the power company. We instruct the men not to direct water streams on the high tension wires.

The only thing we can do when wires are broken is to keep everyone away from them and get in touch with the power company at once.

My suggestion is to give the very best cooperation to the Power Company and they in turn will give good service. Our Power Company will do all they can for the Fire Department night or day.

Clyde Pritchard, Chief, Jackson, Mich.: The Power Company has a service truck which answers all alarms in the city. It is connected with our fire alarm system and receive every alarm as we do. We find that it is a very good thing to have a gas man and electrician at every fire, for it is sometimes necessary to shut off the gas, or have wires cut.

I have no suggestion to offer to improve our present method, other than to say that I think it is a wonderful thing for us to have such a system as we have.

E. C. Haskin, Chief, Highland Park, Ill.: When confronted with high tension wires, I notify the power company as to the location of the fire and order the power cut off in that locality. I also request that a repair man be sent to report to the officer in charge.

When faced with broken wires I give instructions to clear all men and apparatus from the vicinity, detail truck company to cut, tie, chain or remove wire.

I believe that all utilities companies should be interested in the protection of their property to the extent of having competent men with a truck equipped to handle all emergencies, and to respond to all fires. This should be handled on the same basis as the Insurance Patrols. Each company bears its share of the expense. The electric, gas and telephone companies should be most interested from the point of service to the public.

T. C. Warrick, Chief, Kingsport, Tenn.: Since 1919 we have had present, at every alarm, a man from the power company who looks after the high tension and broken wires. He also looks after all leads to residences and business buildings, seals all meters and cuts off the service until a thorough inspection has been made.

This very important problem is well cared for in our town, so we believe, and relieves us of a very great danger through the cooperation of our power company.

(*Continued on page* 979)

HERE IS THE PROBLEM FOR THE NEXT ISSUE

Do you believe, that due to the business depression, the purchase of fire apparatus should be speeded up? Why?

Do you believe that a crippled department would encourage the activities of the arsonist and would it result in heavier loss per fire?

Do you or do you not believe that this is a good time to strengthen the department? Why?

With the Editor

A Merry Christmas and a Happy New Year!

To all of its readers FIRE ENGINEERING extends the wish for a very Merry Christmas!

May all have a New Year full of promise of happiness and prosperity, with the clouds of worry and depression dissipated by hope and confidence in the future.

Replenishing Fuel Tanks When Engine is Running

The hazard of attempting to replenish the fuel tanks of motor pumping engines while the engines and pumps are operating was clearly demonstrated recently in Revere, Mass., where a pumper had been at work for many hours on a dump fire.

According to the newspaper reports when the gasoline in the tank began to run low the pump operator started to pour more gasoline into the tank without shutting down the motor and as a result the gasoline vapor or a drop of the fuel came into contact with a hot exhaust pipe. There was a flash of flame which burned the two firemen who were on the apparatus and damaged the machine.

This incident only serves to emphasize the fact that lines must be shut down and the pump and motor stopped before re-fuelling is attempted. If the motor has been running for some hours it might be prudent to allow the exhaust to cool before the re-filling of the tank.

Was this Carbon Monoxide Poisoning?

A new hazard of dump fires has just come to light as the result of a tragic happening in Holyoke, Mass., where a man and his wife were found dead in their home from what was at first thought to be asphyxiation from escaping gas.

Examination of the premises by the gas company showed that there had been no leak of gas. A queer mist was noticed in the vicinity which had recently been a dump. When a hole was dug smoke came up apparently from a subterranean fire smouldering under the debris in the dump. A trench was dug and two motor pumping engines of the Holyoke Fire Department were called on to flood the ditch. Lazarus Rubin, Chemist of the Massachusetts Department of Public Health, has reported that the tests of the gas obtained by drilling holes in the cellar of the house revealed the presence of carbon monoxide gas in dangerous density. The house was built on newly made land which was once a public dump.

Chief Patrick J. Hurley, of the Holyoke Fire Department, states that he is not sure whether the gases were caused by a smouldering fire or by some chemical action of material in the dump, as there was no evidence of heat. The case is an unusual and interesting one and suggests that municipalities should go slow in the matter of allowing buildings to be erected upon newly made land.

Hazard Which the One Story Block Presents

The one story block presents conditions which offer a difficult problem to the Fire Department. as in such structures there are often as many as seven or eight small stores, the cellars of which are merely divided by wooden partitions. A fire starting in one of the basements will rapidly spread to the adjoining cellars and, as these are usually piled high with boxes and crates, the blaze is sure to emit dense clouds of smoke to hamper the fire fighters.

In spite of the use of cellar pipes and hose streams turned into cellar openings at front and rear, it is usually impossible to reach the heart of the blaze and as the heat and smoke render an attack by the narrow trap-door stairways impracticable, the flames soon communicate to the entire block, both through the cellars and through spaces above the ceilings.

The real solution of the problem would be to enact an ordinance requiring brick fire walls between each store and automatic sprinklers in all basements. Meanwhile a rigid inspections of the cellars to see that all rubbish is promptly removed will act as a preventive of such fires.

Firemen Save Mail Flyer Lost in Fog

The saving of an air mail pilot from death over the sea can undoubtedly be placed to the credit of the members of a Long Island, New York, volunteer Fire Department.

The pilot, on his way from Cleveland, Ohio, to Newark, N. J., lost his way in a dense fog and discovered, by dropping flares which showed him the white caps of the ocean, that he was out at sea. He attempted to fly back to land, without knowing just where he was.

Finally he located the faint glare of a lighthouse, which afterward proved to be Montauk Light.

In the meantime the drone of his motor had attracted the attention of the members of the Cutchogue, L. I., Fire Department, and, realizing the danger of the airman, they sounded the fire siren and drove the fire apparatus to the fairway of the North Fork Country Club, followed by a number of automobiles. Arriving at the grounds, the truck and the cars, by blinking their headlights, indicated to the pilot that he would find a level spot to land.

He came down safely, his engine sputtering with the last gallon of gasoline, and the mail was duly delivered to the local post office. He frankly attributed to the firemen the saving not only of his cargo of mail but also his life, as without their aid he would either have dropped in the ocean or would have crashed without a suitable landing place, as his fuel was exhausted.

NEW YORK CITY OFFICIALLY PLACES NEW BOAT IN SERVICE

Exceeded Contract Requirements in Tests by Underwriters' Engineers—Features Included in the Design of Latest Fire Boat

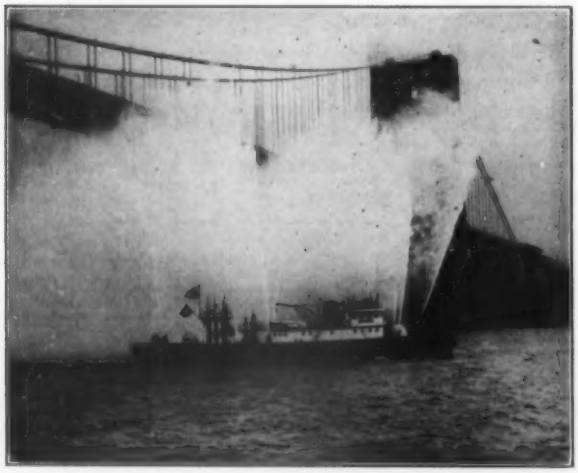
By WILLIAM JEROME DALY

NEW YORK CITY'S new fire boat, the John J. Harvey, the fastest and most powerful marine flame fighter, "showed off" last week for the observation of officials of the Fire Department and many others who had a hand in her design and construction. The exhibition was part of the acceptance test of the new fireboat arranged by the Todd Shipyards Corporation which built her.

The exhibition was held in the Hudson River, with the new George Washington Bridge as background. The Harvey was convoyed up river by the fire boat John Purroy Mitchel. The inspection party headed by Fire Commissioner John J. Dorman was then transferred from the Harvey to the Mitchel and the Harvey then passed under the new bridge and threw a geyser over the span which is 253 feet above the river.

After that the Harvey belched forth Niagaras of water from all turrets, rail pipes and water guns. Then came the water curtain which the fireboat releases to protect herself when fighting flames in close quarters.

Thereafter she launched her little runabout or tender near the 158th Street pier and the tiny craft opened a pump and "shot" two strong streams under the dock to show how fires under piers are extinguished handily.



The "John J. Harvey" Spraying George Washington Memorial Bridge

The new fire boat went into service at the Battery at 6 p.m. December 17, where she replaced the John Purroy Mitchel. The latter was transferred to the station at the foot of Noble Street in Greenpoint, taking the place of Abram S. Hewitt, which in turn replaced the old New Yorker at Fulton Street, Brooklyn.

The New Yorker, forty-five years in service is no longer fit for fire duty. For years she was the flagship of the fire fleet. New York City has not had a new fireboat since the John Purroy Mitchel was built ten years ago.

The new flagship of the fleet is the "last word" in marine fire fighters. On her recent trial trips she exceeded in speed and pumping capacity the maximum requirements of the Fire Department's specifications.

The Harvey is a gasoline-electric craft, and her maintenance cost when not in actual operation or under way will be negligible, in comparison with the cost of upkeep of fire boats that have to be continuously maintained under full steam at their stations in order to be ready for immediate service.

The new boat was named in memory of John J. Harvey, the pilot of the fire boat Thomas Willett who was killed at a fire aboard a transatlantic steamship at the foot of Morton Street, February 11, 1930. This is the first time that a New York fire boat was named for a member of the department. Other fire boats have been named for Mayors of New York and some for the old Burgomasters of New Amsterdam.

The Harvey was designed by Henry J. Gielow, Inc. and built to the highest standards and classification of the American Bureau of Shipping. From keel to truck she is devoid of anything wooden.

The Harvey has attained a speed of 20 miles an hour which is two miles faster than the contract requirements. Five Sterling-Viking gasoline engines of 548 horsepower each serve in a dual capacity of propelling the boat as well as pumping the water.

On a recent trial test in the presence of the engineers of the National Board of Fire Underwriters as well as other marine and fire-fighting experts, the engines developed 2,785 horsepower which is nearly three times the horsepower of her predecessor, the John Purroy Mitchel. The five gasoline engines drive five 340-kilowatt Westinghouse generators supplying two 1065-horsepower motors which propel the twin screws.

Although the contract specifications call for only 16,000 gallons of water a minute, a recent test of her four Le Courtney centrifrugal pumps as conducted by the National Board engineers showed a total discharge of 18,258 gallons of water a minute at 150 pounds pressure while the boat was traveling ten miles an hour. This double duty of speed and pumping capacities proved to be an accomplishment beyond all expectations of the severest critics. The pumping capacity alone is two and a half times as great as the maximum water delivery of the John Purroy Mitchel.

The gasoline supply, with pumps and propelling motors working at maximum, is sufficient for 24 hours continuous duty. The gasoline is stored in three tanks of 2,000 gallons capacity each and is protected in three ways: the Aqua system, carbon dioxide extinguishers and by flooding the tank compartments with sea water. As gasoline is drawn from the tanks to the engines, water replaces the expended gasoline thereby making the liquid content of each tank complete and defeating the possibility of the formation of explosive vapors. The carbon dioxide system of fire extinguishment within the boat is controlled from a remote point on deck. The chemical can be released to protect the engine room or the gasoline tank compartments.

When operating close to a fire, with a possibility of scorching the boat or endangering the lives of her crew, a series of

(*Continued on page* 977)

THE COVER ILLUSTRATION

Very often much of the Fire Department work at fires is carried out on the roofs of buildings, away from the line of vision of spectators on the street. Roof operations involve the opening of holes for ventilating the building involved, ladder operations, and raising hose lines so that the fire may be fought from nearby buildings. The cover illustration shows some of these evolutions. One can see a hose roller on the cornice of a building in the foreground and firemen raising a hose line. On the roof of the building involved is a group of firemen cutting a hole for ventilation, while down on the street the warehouse fire is being fought with heavy streams.

Questions and Answers

NOTE—Readers are invited to send in questions, which will be answered in the order received. Names are omitted from questions unless otherwise specified

Engines in Tandem

To the Editor:

How can two or more pumpers be hooked up to deliver more pressure than either of them will do by itself?

Can two pumpers delivering 300 lbs. pressure each be made to deliver 600 on the same line? How?

M. E. E.

Answer: Where greater pressure is desired than one pumper can supply, two pumpers may be used to deliver the pressure. In hooking up these pumpers, the first one is hooked to the source of supply, and one of the discharge ports of the first pumper is connected to the intake port of the second pumper. The delivery from the second pumper, when both pumpers are in operation, is at much greater pressure than either one of the pumpers alone can supply. As a matter of fact, two pumpers, connected in the manner described above, and each delivering 200 pounds pressure to the water, will deliver nearly 400 at the discharge at the second pumper.

But it is not particularly good practice to create excessively high pressure at the second pump, due to the danger of mechanical injury to either the apparatus or to the hose which it supplies. If high pressure is needed to force water through a very long line of hose, then the second engine is usually placed somewhere near the middle of the line, in the so-called relay layout. In this way pressure dissipated in friction in the hose between the first and second engine is made up by the pressure delivered by the second engine, and thus satisfactory nozzle pressure may be secured without undue strain on either pump or hose.

Use of Tools

To the Editor:

Will you kindly answer the following questions:

1. Under what circumstances and how should firemen use the following: cellar pipe, acetylene torch, roof rope, life belts and door openers.
2. What methods should be followed for reducing incendiarism fires by inspection.
3. State for each case why it is necessary to have cut-offs for gas, electricity and ammonia.

M. J.

Answer 1: Cellar pipe is used for extinguishing fire burning beneath floor in basement or cellars, and occasionally is used on the roof of the building for operating on a fire in cock loft.

Cellar pipe is not employed where there is danger of floor giving away, or where the members have to take too much punishment in remaining at their posts to operate the cellar pipe. In the operation of cellar pipe, a hole is cut through the floor, pipe inserted, after being connected to the hose line, and the water turned on. The handle of the cellar pipe is continually manipulated so as to give both vertical and horizontal deflection of streams. In other words, the object in operating the cellar pipe is to cover as much territory as possible, and thus promptly bring the fire under control.

An acetylene torch in fire department work is usually used for emergency purposes, such as cutting bars to release imprisoned persons, opening up metal doors or other metal coverings which cannot be opened otherwise. Methods of employing the torch are varied and depend to a great extent upon the design of the torch. Refer to any of the many text books, some of which no doubt may be found in local libraries, on the use of acetylene blow torches for cutting.

Roof rope is used for hoisting ladders, tools, hose line, etc., to the upper floors or to the roof of the building. It is also employed in effecting escape from the upper parts of a building in the event that the men are cut off. In hoisting ladders, hose or tools, the roof rope is taken to the roof by the men who proceed up fire escape stairways or by other means. One end of the rope is firmly held and other dropped to the street where it is attached to the device to be hoisted. In the case where roof rope is being used for escape of men trapped on a roof, one end of the rope is attached around some support such as a chimney, pent house, or other object which will not give away under strain. It is assumed that the rope is of sufficient length to reach the street, or to the roof of adjoining building to which escape can be made. When the rope is firmly attached to the object on the roof and dropped over the side of the building in such a manner that the men going down the rope will not be endangered by fire, the men take positions on the edge of the roof and after wrapping a coat or other object around the rope slide to safety.

Life Belt. Numerous life belts have been placed on the market. The chief function of the life belt is to assist in rescue work. For this reason the snap hook is made of greater strength than in the ladder belt and instead of having a swivel connection to the belt, this snap hook is fastened with a ring. Belts may be either made of heavy fabric or of leather. In either case the straps are of leather.

The Life Belt is used in connection with scaling ladder work where rescues are being made, and for other forms of operation where a sturdy belt with strong hook is necessary.

Another type of life belt is made with a small hatchet and pocket, carrying spikes, usually two of which are provided. The spikes are usually of 3-inch length and are employed in rescue work or for other operations, such as attaching a life line to roof, etc.

The Morrissey life belt has as its chief difference the type of hook employed. The rope is passed beneath a lever arrangement and then up around and through the hook. Pressure on the lever produces a braking effect and slows down the rate of passage of rope through the hook. Thus when a rescue is being performed the person sliding down the rope can regulate this speed with precision by manipulating this hand lever. It makes unnecessary the use of any other protection for holding the rope when a person is sliding down it, and simplifies very much the carrying of a second person by means of the life belt to the street.

Door Openers. Door openers are devices which are employed for forcing doors, windows and other coverings. Several of the door openers, such as the adz, Kelley tool, buster bar, Callahan and jimmy are nothing more than the so-called "jimmies" commonly employed in forcible entry work. The Hale and Detroit door openers (described below), however, are specifically made for forcing doors and are rarely used for any other purpose than this.

Hale Door Opener. This is one of the most popular door openers and is quite satisfactory for use on doors which will not respond to treatment by the above named door openers. The Hale door-opener works on a ratchet principle, operating the handle up and downward forcing the compression rod to rise as in the case of an automobile jack.

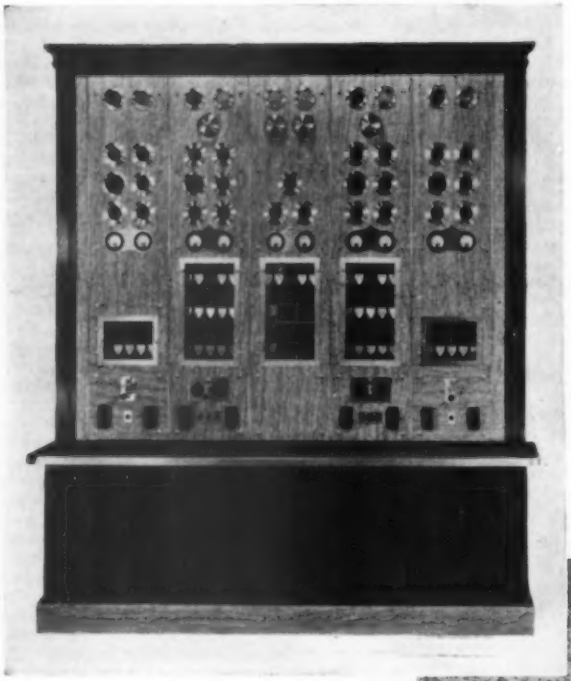
In using the Hale opener, the compression piece is placed beneath the lock, or the lock plate, where it will have a firm part to rest against. The base of the device is so set on the floor that it will not slip. Should the floor be of such material that the opener base might slip, use the heel of blade of an axe to make a depression that will prevent the possibility of slipping. When securely set, the ratchet handle is worked very much in the same manner as an automobile jack, as noted above, till the lock gives. The door opener is only applicable where the door opens inward, as is also the case with the Detroit door-opener described in the following paragraphs.

Detroit door-opener. It differs from the Hale door-opener in that it operates on the lever principle rather than the ratchet principle.

The length of the rod from the fulcrum to the compression piece may be adjusted by removing pin, which is employed for locking the extension, and drawing the extension out to the desired point, and then replacing pin.

As in the Hale door-opener, it is necessary to place the compression piece beneath the lock plate or lock. When this is done and the point of the lever is securely placed on the floor, then the handle of the lever is raised, and the door thereby forced inward.

NEW Gamewell CENTRAL



TYPICAL 3-FOLD CENTRAL OFFICE SWITCHBOARD

(Left)—Built especially for exhibit at the International Ass'n. of Municipal Electricians' Convention, held recently at Jacksonville, Florida. It consists of 2 Box Line Operating Panels, 1 each Primary and Secondary Alarm Operating Panels and 1 Local Alarm Panel. Panels are of Blue Vermont Marble, mounted in an art metal cabinet of strikingly new design and finish.

SECTION OF 3-FOLD EXHIBIT

(Right)—at recent International Ass'n. of Municipal Electricians' Convention, showing 3-FOLD Switchboard and Fire Alarm Boxes.

TRANSMITTING AND RECORDING EQUIPMENT POWER CONTROL PANEL AND POWER PLANT

(Left)—part of the 3-FOLD Central Office displayed at Jacksonville Convention of International Ass'n. of Municipal Electricians.

THE NEWTON,

3-FOLD *Fire Alarm* OFFICE EQUIPMENT

Exhibited at Jacksonville

Only one year ago we announced our 1931 Model Peerless 3-FOLD Fire Alarm Box to the trade. It met with the ready approval of fire chiefs and superintendents of fire alarm; in fact, so well liked were the protective features offered by its 3-FOLD principle of fire alarm transmission that after careful examination, scores of cities adopted it as their standard.

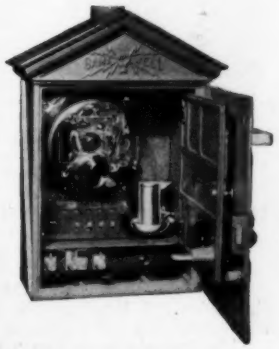
But, the demand for 3-FOLD did not end there. Several municipalities having tested the box thoroughly, investigated the 3-FOLD central office features, and informed us that they not only wanted the new boxes, but also a complete 3-FOLD fire alarm system because of the added protection offered against broken or shorted circuits, which on the old single-fold system were likely to cause the loss of alarms by putting scores of boxes temporarily out of commission.

Now, our new 3-FOLD Central Office Equipment is ready. A complete installation was on display at the recent convention of the International Association of Municipal Electricians, held recently at Jacksonville, Florida; the same apparatus was later demonstrated before a joint meeting of the Eastern Association of Superintendents of Fire Alarm and Police Telegraph and the New Jersey Municipal Signal Association. Both exhibits were received with a great deal of interest and created much favorable comment. Two complete 3-FOLD Fire Alarm Systems will soon be installed in prominent cities—orders for several 3-FOLD Central Offices have also been received.

Before you purchase any new fire alarm equipment, investigate the advantages offered by this new Gamewell 3-FOLD apparatus. Our engineers will be glad to show you its advantages over your present single-fold system.

THE 3-FOLD BOX

Gamewell 3-FOLD Fire Alarm Box which goes with the new 3-FOLD Central Office equipment. Scores of cities have already adopted this box as their standard because of the striking protection provided by its 3-FOLD principle of fire alarm transmission.



Within the 3-FOLD Box, the mechanism providing the 3-FOLD principle of fire alarm transmission is surprisingly simple—just a small unit built into the upper part of the movement.

GAMEWELL COMPANY

MASSACHUSETTS

We shall appreciate your mentioning FIRE ENGINEERING *when writing advertisers.*

As in the case of the Hale door opener, the Detroit door opener is suitable for use only where the door opens inward. Care must be taken in the use of both the Hale and Detroit door-openers not to place the compression piece of the device against the panel of the door, for the application of force in such a case would cause the panel to be forced inward without the door giving. The strength of the panel is comparatively small and unnecessary damage may be done by carelessly placing the compression piece against the panel.

Answer 2: Incendiarism is reduced by periodical inspection, due to the fear by incendiary of detection. When inspectors report periodically to a premise, and check up on the stock, general housecleaning, etc., any sudden change in the arrangement or the moving out of stock would be looked upon suspiciously. An unanounced inspection will usually deter a fire bug from starting a fire.

The detection of suspicious conditions, or actions on the part of tenants in the buildings, reported to superiors may result in preventing incendiarism, or conviction of incendiarism in the event that a suspicious fire occurs.

Answer 3: Cut-off for gas is necessary in order that members of the department may not be exposed to serious injury in the event that fire occurs on the premises. For example, where fire is burning in the basement, and gas is escaping, the danger to men entering the basement is extremely severe. The gas cut-off located outside of the building enables the department to cut off the gas and thus remove this particular hazard to the men operating at the fire.

Electricity cut-offs are desirable in that they enable the department to deaden all equipment and wiring thus removing a hazard to the men operating at a fire.

Ammonia cut-offs are essential, for ammonia gas is highly pungent, and dangerous to inhale. Mixed with proper proportions of air, ammonia gas is generally considered to be explosive. Men cannot operate in atmospheres charged with a high percentage of ammonia gas without elaborate protective equipment. Proper cut-offs for ammonia will prevent further escape of gas and also possible bursting of ammonia containers due to the increasing pressure incidental to heating at a fire.

Snodgrass Made Vice-President

At the regular meeting of the directors of the American-LaFrance and Foamite Corporation, of Elmira, N. Y., on November 17, H. S. Snodgrass was appointed Vice-President of the company in charge of all manufacturing operations.

H. S. Snodgrass

Mr. Snodgrass went with the American-LaFrance and Foamite Corporation on May 1, 1927, in the capacity of Purchasing Agent and subsequently was made Works Manager. Previous to this he was Purchasing Agent of the Moline Plow Company at Moline, Illinois; Purchasing Agent of Fageol Motors Company of Ohio, at Kent, Ohio; and Superintendent of Production of American Car and Foundry Motors Company, at Detroit, Michigan.

"Fire Fighting"

Under the above title the Federal Board for Vocational Education, of Washington, D. C., has issued Bulletin No. 155, containing 142 pages, on the subject of training firemen.

This Bulletin goes into a thorough analysis of the details of the fireman's job, and lists the various topics which should be included in a course of instruction.

It is not, however, intended as a handbook of instruction for members of Fire Departments, but rather a guide to those identified with training schools for firemen.

In preparing this Bulletin, the Federal Board for Vocational Education, under the immediate direction of Frank Cushman, Chief of the Trade and Industrial Education Service, and Special Agent, C. F. Klinefelter, and James R. Coxen, Regional Agent for Trade and Industrial Education for the Pacific States, did a very excellent piece of work. The book should prove of tremendous value to those departments intending to establish course of instruction for their members.

Copies of the book may be secured from the Superintendent of Documents, Washington, D. C., at 30 cents each.

Progress is being made in the construction of a fire station in Osborn, Mo.

Fire Losses Show a Decrease

According to fire losses figures issued by the National Board of Fire Underwriters, the total fire loss in the United States for the past eleven months is lower than for a corresponding period in 1930.

Fire losses for November amounted to $35,287,641 as compared with $35,682,577 for November, 1930. The total for the eleven months of this year is $411,503,056 or $9,400,000 less than the total for a similar period last year.

Fires losses in Canada, as estimated by the Monetary Times, have been figured at $2,307,150 for the month of November with the province of Ontario leading in losses. For November, 1930, the total loss in the Dominion was reported at $3,175,075. However, the total loss figures from January up to December are much higher this year than the previous year.

Eastern Fire Alarm Men Meet

Chief C. W. Randlett, of Newton, Mass., was host to the Eastern Association of Superintendents of Fire Alarm and Police Telegraph, at the quarterly meeting held at the Newton Fire Alarm Headquarters, December 9 and 10. A delegation was present from the New Jersey Municipal Signaling Association, led by President Fred Hock of Irvington.

Chief James Warnock of Swampscott, Mass., was the presiding officer. The following papers were presented:

"Methods of Establishing, Maintaining and Testing Ground Connections on Municipal Signal Circuits," "What Revisions Should be Made in the Regulations of the National Board of Fire Underwriters Relating to Municipal Fire Alarm Requirements and Equipment," and "Floating Battery Operation and Maintenance as it Applies to Central Offices Operating on Rectifier Floating Battery Method."

A plan for tying up the individual municipal signal associations in various sections of the country for a freer exchange of ideas was presented, the new organization to be known as the "Associated Signal Services." The proposed organization would consist of an Executive Board, Chairman and a Secretary-Treasurer and each local association would have two representatives on the Board.

On the second day of the meeting, the members witnessed a demonstration of the new Gamewell 3-Fold Fire alarm system at the Gamewell factory in Newton. Afterwards a luncheon was served at the plant.

Industrial Chiefs Hold Essay Contest

Chief William J. Lutz, of Wilmington, Del., awarded twenty prizes and forty-five letters of honorable mention to the prize winners in an essay contest conducted during Fire Prevention Week by the Industrial Fire Chief's Association. The association received 3,500 essays from the school children. Local newspapers cooperated by giving considerable publicity to the contest. J. J. Ashton of the Delaware Safety Council addressed the winners.

Fire Fan Honored by Fire Council

Paxton Mendelssohn, Detroit fire fan and active member of the Fire Prevention Committee of the Detroit Board of Commerce has been appointed Chairman of the Fire Casualty Statistics Committee of the U. S. Chamber of Commerce—Fire Waste Council Division.

The Fire Casualty Statistics Committee will confine its energies to collecting and tabulating facts relative to unusual fire casualties, injuries, accidents, etc., with a view to recording new and extraordinary fire hazards.

Newspaper clippings, reports and observations of unusual events in the fire fighting field should be mailed to Mr. Mendelssohn who has offices in the Buhl Building, Detroit, Mich.

The Boy Scouts of America and the Fire Prevention Association of Ohio are sponsoring a novel Fire Prevention Contest, which will close December 31, 1932. It is open to all scouts in good standing. Prizes will be awarded for the best fire prevention display by a troop of Boy Scouts at a fair, school picnic or other gathering; best talk on fire prevention by a scout at a school or any public gathering, and the best collection of cleap up photographs.

The City Council of East Orange, N. J., approved the recommendations of the Fire Commission that a central office fire alarm system be installed in the new headquarters building at a cost of $35,000. Several improvements over the present system are to be provided.

FAMOUS EXCURSION STEAMER DESTROYED IN PITTSBURGH

Fire From Unknown Cause Envelopes Craft While Tied Up at Her Winter Quarters—Second Pleasure Craft to Be Burned to Water's Edge

By WILLIAM E. PATTERSON

THE excursion steamer, "Julia Belle Swain," one of the most famous of river craft in the Pittsburgh District, which plied the Ohio, Monongahela and Allegheny Rivers, burned to the water's edge on Wednesday, December 2, about 10:45 a.m., in one of the most spectacular daylight harbor fires that have taken place in the Pittsburgh district for years. The fire started from some unknown cause, while the vessel was moored at her winter quarters on the south bank of the Monongahela River, a short distance beyond the city limits at Becks Run. She was operated daily and Sunday in the excursion trade during the summer months and during the fall and early winter evenings as a dance boat.

So intense was the heat from the fire, as the flames swept through the large vessel from stem to stern, that railroad ties of the Pittsburgh and Lake Erie Railroad, New York Central Lines, were ignited, as well as telephone poles and wires nearby.

To prevent the destruction of the railroad tracks and telegraph poles, a yard locomotive was dispatched to the scene, and with railroad fire hose attached to the injector of the locomotive, the crew succeeded in extinguishing the burning ties and poles.

A telephone or "Still Alarm" was received through the Pittsburgh Central Fire Alarm Office, and by Engine Company No. 12, located a distance of two miles west from the burning vessel was dispatched. It responded with a 1,000-gallon triple combination gasoline pumper and a combination, hose, chemical and turrett wagon, but owing to the long distance between the nearest fire hydrant and the fire, over 1,600 feet, the firemen with all the hose carried on both apparatus, were unable to render any service in saving any part of the large vessel. The boat was beyond saving by the time the firemen arrived.

Upper—Pleasure Boat in Service on the Ohio River. Lower, Smouldering Ruins of the "Julia Belle Swain."

After seeing that the railroad employes with the use of the fire stream from the yard locomotive, could take care of what fire was still burning on the railroad ties and telegraph poles, No. 12 Company returned to their Company Quarters.

The pilot of the vessel was doing some work when he discovered smoke coming from the kitchen on the deck below. He ran for a bucket of water, but by the time he got it and returned to the kitchen, he was unable to make any headway against the flames.

So rapid did the flames spread, that he was forced to jump into the river and swim to the shore. A few minutes later the vessel was rocked by an explosion when the flames reached the oil drums and other combustibles in the engine room. The blast hurled burning embers into the Lake Erie Railroad Yards.

The watchman, ordinarily stationed on the vessel, was absent on a shopping errand when the fire broke out.

The "Julia Belle Swain" was built in 1913 at Stillwater, Minn., at a cost of approximately $90,000. Her first service was at Pensacola, Florida and at Mobile, Alabama. In 1924, the vessel was brought to the Pittsburgh region, and since then, plied the Monongahela, Ohio and Allegheny Rivers in the excursion trade.

The "Julia Belle Swain" was the second river excursion steamer to be destroyed by fire in the Pittsburgh district during the present year. The steamer "Greater Pittsburgh," formerly the "Homer Smith," the largest and finest excursion steamer, between Pittsburgh and Cincinnati, burned to the waters edge on March 11, 1931 at the foot of Page Street, on the Ohio River, with a loss of $90,000.

WHAT'S BURNING

THE following list includes fires of $25,000 loss and over in the United States and Canada, for the periods designated in the headings. These figures, compiled from telegraphic reports, are based on estimates made at the time, and are subject to later investigation and consequent revision. Taken as a whole, however, they give an approximately correct view of the losses incurred. The figures represent loss in thousands of dollars.

Week Ending December 11	Loss in Thousands of Dollars
MARSHALL, MO.—Annex of Thomas Motor Car Co.	25
LACONIA, N. H.—Davison garage and 50 cars damaged	25
JERSEY CITY, N. J.—Property occupied by V. J. Curcio & Co.	75
ALBANY, ORE.—Sternberg saddle factory destroyed	125
ALTOONA, PA.—Several business establishments	150
CARLTON, MICH.—High School bldg. destroyed	25
GUILFORD, ME.—Farm property of Mrs. A. Hudson	35
CHICAGO, ILL.—Curtis Junior High School damaged	80
HORATIO, ARK.—Goff bldg. on Main St. destroyed	25
SANTA CRUZ, CAL.—Property of Walter Schilling damaged	35
DUBLIN, GA.—Silvers Dept. store damaged	30
CHICAGO, ILL.—Business property at 1105 Fulton St.	45
CHELSEA, MASS.—Waste mill of Yoffee-Krassow, Inc.	25
GREENVILLE, N. C.—Tobacco warehouse of McGowan & Cannon	125
BLACKFORD, OHIO—Plant of Cambria Clay Products Co.	150
RICHMOND, VA.—Business property 5-9 Governor St.	50
CHICAGO, ILL.—Property at 167-73 W. Lake St. damaged	125
PARIS, KY.—Cleaning plant destroyed	45
ATHOL, MASS.—District Court bldg., adj. property	25
MAUCH CHUNK, PA.—Bldg. occupied by Pancher Beverage Co.	80
BELLOWS FALLS, VT.—Business and residential property	80
MAYBEN, W. VA.—Mill of Ritter Lumber Co. destroyed	125
WOLFVILLE, N. S.—Evangeline Inn destroyed	25
PETERSBOROUGH, N. H.—Walbridge residence, Nubanusit Lane	25
MOLINE, ILL.—Arb building damaged	65
ARTHUR, IOWA—Plant of Crackerjack Popcorn Co.	45
LOUISVILLE, KY.—Wilson Seed Cleaning Plant	25
McKENZIE, ALA.—School building destroyed	45
BUFFALO, N. Y.—Residence of B. Kloop, Lake Shore Road	45
SOUND VIEW, CONN.—Twelve cottages, dance pavilion and garages	35
CLEVELAND, OHIO—Roosevelt Apartments, Cleveland Heights	250
DUBUQUE, IOWA.—Plant of Maizewood Products Co., destroyed	160
SYRACUSE, N. Y.—Marangone bldg., adj. property	80
NEW BERN, N. C.—Several business establishments	160
SAINT MARYS, OHIO—Pavilion at Gordon State Park, destroyed	30
Week Ending December 18	
TROY, ALA.—Folmar bldg. destroyed	80
TITUSVILLE, FLA.—Dredge of Clark Dredging Co., destroyed	45
CHATHAM, VA.—Business property on Main St.	45
LA TUQUE, QUE.—Garage of Champoux Brothers damaged	25
SEWANEE, TENN.—Emerald Hodgson Hospital destroyed	100
BUFFALO, N. Y.—Property of B. H. Phillips, Lake Shore Rd.	25
WASHINGTON, D. C.—Franklin Hotel damaged	25
HAZEL, KY.—Factory of B. F. Holifield & Son	45
COUNCIL BLUFFS, IA.—Iowa Soda Products Co. factory	125
ROSLYN, N. Y.—Store house on C. H. Mackay estate.	35
BIEBER, CAL.—Block of frame business bldgs.	50
MONTREAL, QUE.—Business property, 26-46 Notre Dame St.	250
ELLICOTTVILLE, N. Y.—Sheds of Ellicottville Basket Co.	25
SILVERTON, ORE.—Property of Silver Falls Timber Co.	30

BENWOOD, W. VA.—Garage and 5 trucks of R. Koehler..... 30
CHARLOTTETOWN, P. E. I.—Falconwood Hospital destroyed. 200
UNIONTOWN, PA.—Whse. of P. P. Long, adj. property..... 65
BROWNSVILLE, TENN.—Robertson Theatre, adj. buildings..... 50
NEW YORK, N. Y.—Lucas Paint Whse. damaged..... 150
POY SIPPI, WIS.—General store of G. M. Boyson, destroyed..... 25
TUCKERMAN, ARK.—Porter residence destroyed..... 25
APPLETON CITY, MO.—High school library destroyed..... 25
JERSEY CITY, N. J.—Property occupied by St. George Printing Co. 25
SCANDINAVIA, WIS.—Business property damaged..... 30

Gas Blast Injures Chief, Kills Three

Two firemen and a student are dead because two eighteen-year-old boys in Berkeley, Cal., believed they could repair a minor gas leak in the dead end of a gas main in a residence.

According to statements made to the police by the boys, they detected the odor of gas in the basement of the Saunders home and it was traced to a dead end jutting out into the basement. It was planned to unloosen the cap on the pipe, apply shellac and then tighten the cap. The cap was turned too much and it was blown off by the gas pressure. The boys tried to replace the cap but became sick from the gas. One boy directed the other to shut off the pilot lights under the water and the gas furnace and then they rushed upstairs to pull the electric switch, extinguish the gas cooking stove jets and to notify the Fire Department.

When the Berkeley firemen arrived they found a small blaze in the basement. The odor of burning rags prevented the firemen from detecting the odor of leaking gas. Chief

The Berkeley, Cal., Home After the Gas Explosion

Haggerty believed the blaze was under control and firemen were busy wetting down embers on floor joists.

And then came the blast.

A boy directly in front of the house was killed when he was struck by a heavy piece of joist. A hoseman along with Chief Haggerty was blown through the building. At first it was believed that the Chief and a number of the firemen who were removed to the hospital, would die, but according to the latest information all the men are now on the road to recovery. One fireman received third degree burns and suffered from a broken pelvis. He died in the hospital.

Additional fire alarms brought firemen and ambulances. Calls for physicians brought practically every available doctor in the city to the three hospitals. In all seventy-five persons were brought to the hospitals for treatment because of the explosion. Police squads had considerable difficulty in keeping back the huge crowds that had gathered.

Two pieces of fire apparatus, Chemical No. 2 and Hose No. 8, which were in front of the house when the blast occurred, were badly damaged by the concussion and the falling timbers.

While it will be several weeks before Chief George Haggerty and two of the more seriously injured firemen will be able to leave the hospital, the men are considered out of danger.

The dead end of the gas main in the home was the result of the 1923 conflagration in Berkeley. An investigation is being made to determine if there are other dead ends and to prevent a similar catastrophe. Jay Stevens, State Fire Marshal, and the Pacific Gas and Electric Company are participating in the investigation.

WESTCHESTER CHIEFS DISCUSS REFRIGERATOR AND FILM RISKS

Well Attended Meeting of Chiefs' Plan Held at Mount Vernon, N. Y.—Two Excellent Addresses Are Given—Chief Mulcahey Honored

TWO interesting addresses signalized the regular monthly meeting of the Westchester County, N. Y., Fire Chiefs Emergency Plan, which was held at Fire Headquarters, Mount Vernon, N. Y., at 8:30 p.m. on Wednesday, December 16, one of which was illustrated by moving pictures. The meeting, which was well attended, was called to order by the President, Chief D. Wiley Travis, of Peekskill. The Secretary-Treasurer reported a balance in the treasury of $395.21, with all bills paid to date.

The first address was by Leo Lieberman, Chief Chemist of the Bureau of Fire Prevention, New York Fire Department, who spoke on fire regulations in New York as regards electric and gas refrigerators and refrigeration plants, and on the regulating of the use and storage of inflammable X-ray films. The regulations in the big city as regards refrigerators using inflammable and irritant gases were, he said, very stringent. In large installations the units must be installed in vapor tight enclosures, as must also those in schools. In large installations remote control must also be provided for, and ventilation to the open air or, where this is impracticable, through an exhaust system, must be installed.

Of the various chemicals used in such refrigerators, he said that ammonia is highly explosive; sulphur dioxide and ethyl-chloride, highly irritant; butane and iso-butane, highly inflammable, and in the case of carbon dioxide, while non-explosive, special safety valves must be installed, as high pressures are maintained.

Referring to the inflammable nitro-cellulose film used by physicians and in hospitals for X-ray work, Mr. Lieberman said that doctors disregard fire hazards and unless regulated, such films are exposed and are a serious danger to life and property. He referred to the tragedy in the Cleveland Clinic, and said that even before that event New York City had adopted stringent regulations for the use and storage of such dangerous films.

The second address was by Ralph H. Allen, District Manager of the International Fire Equipment Corporation. Mr. Allen described the principle upon which the Shur Line extinguishers operate, and showed two reels of moving pictures on fire extinguishment in homes, business houses, automobiles, etc.

There was some discussion on both of the addresses, which was followed by a round table talk on various subjects by the members. Chief Gibson spoke of the excellent course of instruction given by Captain Yates of the Red Cross in first aid and advised the Chiefs to take advantage of this for the benefit of their men. There is, he reminded them, no charge for this course, the only expense being the purchase of text books. Captain Yates added a few words, offering to cooperate with any departments which desired to inaugurate a class in first aid.

Ex-Chief James J. Mulcahey, of Yonkers, N. Y., was elected to Honorary Life Membership in the Plan, and it was decided to present this to him at a testimonial dinner to be given him at a later date. Arrangements for the dinner were left in the hands of Chief Steuhl, Chairman of the Entertainment Committee.

The Chair then introduced Chief Chambers, of Yonkers, and Chief Anderson, of Cos Cob, Conn., both of whom made short addresses.

On the invitation of Chief Rossner, of Chappaqua, N. Y., it was decided to hold the next meeting in that village, on Wednesday, January 20, 1932.

An excellent repast was given the members by Chief Gibson and his men after the meeting.

The Council of Hillsdale, Mich., voted to purchase fire apparatus at a cost of $10,300. The proposition was defeated at the annual spring election two years ago.

The members of the Eastchester Township Fire Department, including the villages of Bronxville and Tuckahoe, N. Y., in cooperation with the Paid Firemen's Association of Eastchester, a newly formed organization, and the Recreation Commission, have assisted a number of families in want in the township, subscribing for this relief from their own salaries. The firemen are also reconstructing toys for poor children for Christmas.

Needham Has Combined Headquarters

The new police and fire headquarters building, under construction in Needham, Mass., from designs by George Ernest Robinson, of Boston, is nearing completion and will be in service before the first of the year.

Chief T. Robert Quinlan, Needham, Mass.

It is so planned that each unit is entirely separate from the other although a central tower of Colonial type joins the various sections and harmonizes the whole into a distinct and striking ensemble of red brick structures.

The trim is in white and the roofs are of slate. The main floor of the Fire Department portion of the building has three double doors for apparatus and a side door. There is an enclosed patrol desk and a separate room in which the fire alarm equipment will be installed. The office of Chief T. Robert Quinlan is up a short flight of stairs and there is an outer office for the clerk. On the second floor are three dormitories, officers' rooms, locker room, toilets and shower baths, and a kitchenette fitted with an electric range. In the front is a large smoking and recreation room. In the rear of the first floor with entrance at the side is a machine shop and space for the fire alarm trucks and repair wagons.

The apparatus to be stationed in this house will consist of an American-LaFrance ladder truck, a Maxim 1,000-gallon pumper, a White combination hose and chemical, a Buick hose wagon, and a Buick chief's car.

On the first floor of the police department section are the central rotunda, booking desk, guard room, matron's room, first aid room, boys' detention room, cell block, and in the rear a garage for police cars, ambulance, and motorcycles. On the second floor are the office of the Police Chief, sergeant's room, smoking room, two sleeping rooms for emergency use, record room, and the photographing and finger printing rooms. In the basement there is a rifle and pistol range for target practice. The police section as well as the Fire Department section is provided with brass sliding poles. There are separate oil heating units installed in the basements of the fire and police buildings.

Combined Fire and Police Headquarters in Needham, Mass.

The building is beautiful in appearance and is an ideal combination for the town of moderate size. With each department entirely separate from the other, the usual objection to a combined headquarters is removed.

HARRY BELKNAP.

Waiser, Ida., is contemplating the purchase of a combination hose and chemical car to cost about $8,500.

Chief McConnell of Anderson, Dead

Chief Foster F. McConnell of Anderson, S. C., died at the County Hospital as the result of pneumonia.

He joined the volunteer Fire Department back in 1906. At that time the apparatus was owned by the firemen and the young men-about-town used to meet once a week and drill in their gay uniforms. In March, 1911, the volunteer companies were abolished and a Chief and three drivers were employed by the council to be at the station at all times. At that time Mr. McConnell was one of the drivers. In October, 1919 when the Chief at that time was forced to resign because of ill health, McConnell became head of the department.

In 1920 while fighting a fire in a motion picture theatre, Chief McConnell nearly lost his life. He became trapped in the operating room and was overcome by fumes resulting from burning film. He succeeded in crawling through a trap door to the top of the building where he was found.

Chief McConnell is survived by his widow and a son.

New York Places Fire Boat in Service

(*Continued from page* 970)

perforated water pipes around the outside of the boat will form a curtain which will deluge every part of the exterior of the vessel.

The Harvey has eight water guns, one on deck forward of the pilot house, two atop the pilot house, two amidships on a raised platform and three perched on a battleship mast astern. Two manifold outlets for hose lines are located amidships, each with twelve discharge gates to 3½-inch hose lines. Hose can be "stretched" ashore or to nozzles set in swivel holders mounted on the gunwales. The new boat carries 4,500 feet of hose. For oil, gasoline or other chemical fires, the Harvey carries four tons of foam powder, which, when mixed with water, generates 64,000 gallons of fire foam. For fires under piers or in cases where shoal water might ground the fire boat, the Harvey carries an auxiliary fire fighter of the runabout type which can be quickly lowered overside by an electrically operated boat crane. This tiny craft is speedy and has a fire pump which throws two ⅞ inch streams 150 feet through a pair of standpipes.

The Harvey's searchlight is 1,500,000 candle power, in addition to which there are three airport flood lights of 5,000 candle power each illuminating the docks and for an area of fifty feet around the vessel to facilitate the work of the firemen. Portable lights will be used when descending into hatchways of ships.

The heat of the exhaust from the engines of the new fire boat is utilized in a waste heat boiler enclosed in the stock to generate steam for heating purposes as well as for thawing. The heating system is arranged to prevent ice or sleet formation on the open decks. A secondary means of heating while the boat's engines are shut down awaiting an alarm of fire is an automatic oil burner mounted on the waste heat boiler remotely located from the gasoline area of the boat.

While moored at her station, the Harvey will take her electric supply by means of a plug connection to a public utility service. The fire alarm telegraphic communication will be maintained on the boat by a connection to the boat station ashore.

Only the engine room crew and the pilot will sleep aboard, the officers and the firemen being quartered in the station. The quarters aboard the boat are equipped with a complete galley. All bilge and soil pipes lead into a septic tank to prevent pollution of the harbor.

In addition to the customary marine telegraph and telephone between the pilot house and the engine room, the Harvey is equipped with a separate marine type telegraph in the pilot house for signalling the engine room for the regulation of pump pressure. The entire net work of water pipes, gates and valves from the four suction screens in the hull to the outlets on deck is reproduced in miniature and mounted in the engine room for the facility of the engineers.

The Harvey is manned by a picked crew selected by Assistant Chief of Department John J. McElligott who was for several years in charge of the Marine Division of the Fire Department.

The City Council of Ukiah, Cal., is considering improvements to the fire alarm systems. The Mayor is investigating the proposed plan.

Floating Battery on Electrical Circuit

(*Continued from page 962*)

made at intervals of several hours during the first week of operation. For a cell of the 6-ampere hour chloride or 15-ampere hour Ironclad a current flow into the cell of approximately 15 milliamperes will maintain the correct cell voltage. The cell voltage, however, is the important thing to watch as the current will be somewhat variable depending on acid density, temperature, primary voltage variation, etc. Cells of the pasted type as a rule operate with higher specific gravity acid and consequently will require more current to maintain proper cell voltage.

The maximum efficiency of a copper oxide rectifier disc is approximately 75%. In practice, however, it is usually not feasible to work at the most efficient point. The Gamewell special rectifier has an efficiency of between 35 and 50% depending upon tap selection, output, etc. This is the overall efficiency of the entire rectifier not of the disc unit alone. It includes transformer and other losses. A unique feature of this rectifier is that it can be adjusted to deliver a certain output at any voltage within its range without the use of power absorbing resistors. All other rectifiers which have been offered for fire alarm service, at least so far as is known to the writer, have this efficiency lowering evil. These rectifiers are designed for rated output at a maximum voltage and any requirement for this output at lower voltage or any change in current itself must be obtained by slide wire resistors which not only are wasteful of power but introduce movable contacts into the circuit. Practically all rectifiers have negative resistance characteristics which is to say that the internal resistance is lowered as the current increases resulting in still further current increase until the point of burnout occurs. A ballasting component must be provided to protect against such an occurrence; in the usual case this takes the form of a fixed resistor which absorbs power at all times but the same non-power absorbing feature which is provided in the Gamewell unit for controlling output serves in this dual capacity with consequent improved efficiency.

Overall Efficiency of Several Operating Schemes

A word about overall efficiency of the several operating schemes which have been or still are being used. The least efficient of all perhaps is the individual dynamotor with either a common battery on the motor end or an individual battery floating on the generator end. If it is assumed that in all cases the primary source is A. C. then there will first be a large motor generator set with an efficiency of say 70% supplying a floating battery which losses are 10% then the small dynamotor with its very low ratio of about 15%. The net result is an efficiency of 9.5% and it must be remembered that for first cost economy the dynamotors will have fixed voltages perhaps two or three different values, say 30-45-60 volts, so that the circuits must have useless resistance added to match the nearest voltage.

Next let us consider duplicate sets manually cycled. First, the motor generator set at 65% then a rheostat loss of 25% as an average (this is based upon using a 125-volt generator and grouping circuits in series to approximate 95 volts per charging branch or on 250-volt generator with 190-volt grouping). Next a battery efficiency of 80%. Net result overall, 39%.

Now a rectifier floating battery arrangement. A. C. power is fed to rectifiers direct. Rectifier efficiency, say 40% floating battery, losses 10%. Net overall 36%. This will, of course, be reduced if the rectifier is of a type using output resistors.

To put it in different form, for the dynamotor scheme there must be purchased $1.05 worth of power for about ten cents worth of service; for duplicate sets there will be obtained ten cents worth of service from every twenty-six cents, and on rectifier floating the power will cost twenty-eight cents for the same service.

Economy of Rectifier-Floating-Battery Operation

It is on maintenance and replacement where the rectifier-floating-battery principle comes into its own. The battery manufacturers claim that their cells will last at least twice as long on floating charge as on cycle charge. The copper oxide rectifiers surely seem to have an unlimited life. Samples have been in service for over four years with no deterioration other than a very slight reduction of output after the first few months. Rectifiers either of the gas filled or filament type such as the Tungar, Rectigon and UX-280, have a limited bulb life, a matter of 2 or 3 thousand hours (85 to 120 days) at best. A properly floated battery does not gas, therefore there is little evaporation and consequent refilling and cleaning.

Mr. Ames, of Providence, has prepared a comparison of replacement costs apportioned yearly on a 50-circuit system. The dynamotor method, $325.00 per year; duplicate battery, $1,125.00 and rectifier floating battery, $225.00 yearly. As to the maintenance cost there are no definite figures, but there would no doubt be a decided saving in favor of the rectifier-floating-battery scheme. Mr. Fickett, of Boston, states that his maintenance cost is practically nothing and Mr. Henderson, of Fort Worth, claims that it is necessary to replace evaporation only every 5 months as compared to 2 months when on cycle charge.

Notes on Maintenance

Maintenance is certainly reduced, but the equipment must be intelligently supervised. The batteries must be maintained at 2.15 volts per cell and a poorly calibrated voltmeter will not serve as an excuse. Be sure the meters are correct; use only D. C. instruments of the permanent magnet type; A. C. thermocouple or hot wire instruments will give incorrect values. Check daily from the switchboard the voltage of each set and every few months, when water is added to the cells, check each cell with a low reading voltmeter. The battery supplier will furnish complete instructions for your particular battery.

The discharging voltage of a lead-acid cell is 2.0 volts. The correct floating voltage is 2.15 volts. If there is a primary power interruption and the battery is called upon it will start discharging at 2.15 volts or whatever has been maintained as the floating value; the voltage will drop rather quickly (an hour or so) to its usual value of 2.0 volts. This drop will of course be reflected in the line current and while it will probably be of no consequence it is well to appreciate that it will happen. Practically all rectifiers have some back flow of current when the primary power is interrupted (the bulb types are exceptions) in the Gamewell copper oxide unit this amounts to less than 5% which is negligible.

The current delivered by a rectifier is a series of unidirectional pulses which for all purposes can be considered as a smooth direct current component plus a superimposed alternating current of twice the primary frequency. If telephoning is to be done on a circuit supplied by such a rectifier, assuming no battery is floating, this alternating wave will produce an objectionable hum. The connection of a battery to the rectifier as would be the normal condition for floating service reduces this hum to a negligible amount; of course it is possible to provide filtering equipment so that this noise is completely eliminated even when no battery is used. Filtering equipment introduces one more unit into the fire alarm circuit which in any case lowers the

Los Angeles Firemen Demonstrate a New Type of Helmet

Two members of the Los Angeles Fire Department are here shown demonstrating the new Gibbs breathing apparatus which is provided with its own supply of oxygen, sufficient for two hours. The top of the headgear is fashioned of fibre and asbestos and is insulated against electricity. The device has also proven of value in under-water cases.

operating efficiency and may be a source of trouble so that except in some special instance perhaps it is not to be recommended.

(From an address delivered at the International Association of Municipal Electricians' Convention, October 27, 1931, Jacksonville, Fla.)

The Volunteer Fire Department

(*Continued from page 966*)

from a plain nozzle, due to the sudden change of direction of the stream at the point where the stream enters the tip on the cellar pipe. But the range of cellar pipes is much greater than the range of distributors. Not only is the range greater but the size of the stream is larger so that it has sufficient body to handle advanced fires. The Hart or the Baker cellar pipe has an advantage over the bent cellar pipe because of its convenience in closed quarters. The Hart or the Baker pipe can be used in a small passageway or room and the stream manipulated in any direction by means of the handle on the pipe. With the bent cellar pipe it would be necessary to move the entire line as well as the pipe in order to secure a change in direction of the stream. Should an abrupt change in direction be required, it would be impossible with a bent cellar pipe.

In order to get the Baker or Hart cellar pipe into service through a floor, cut a hole ten inches square. In operating the pipe, the stream should be directed at an angle upward so that the maximum range may be secured. Care must be taken, however, that the stream is not directed at so high an angle as to strike the floor beams or other obstructions which would destroy its effectiveness. This was explained in a previous chapter. The cellar pipe must be operated manually so that there is a good distribution of water. Unless the men are conscientious and careful in this work, there is a possibility of excess water being used without securing full effectiveness.

As soon as the fire is brought under control in the neighborhood of the cellar pipe, the pipe should be shifted to another position and its operation continued until such a time as it is deemed proper to shift the pipe again or take it out of service.

The chief mechanical differences in the Hart and the Baker pipes follow:

Difference Between The Two Nozzles

In the Baker pipe, the horizontal and vertical pipes are brazed together making one pipe, while in the Hart pipe, the horizontal and vertical pipes are hinged together and fold up. In the Baker pipe, the rod controlling the nozzle manipulation is on the outside in front of the vertical pipe, while in the Hart pipe, the rod for this purpose is located on the inside of the vertical pipe. In the Baker cellar pipe, the long lever from the rod controlling the movement of the nozzle, enables the operator to get back from the hole cut through the floor. With the Hart pipe, the rod controlling the nozzle is carried up vertically and has a short T-handle. This arrangement necessitates the operator bending over the hole cut through the floor. To overcome this, there is a spray on the vertical pipe just below where the horizontal and vertical pipes are joined. This prevents the smoke and heat from coming up through the hole. In the Baker pipe, the nozzle turns two-thirds of a circle while in the Hart pipe, it turns in a complete circle.

The Round Table

(*Continued from page 968*)

J. N. Sullivan, Chief, Utica, N. Y.: On all night fires, response is made by the local electric utility troublemen and also by our operator of our lighting equipment wagon. In the event of high tension wires interfering they are either cut or turned off, on our order. These men take care of broken wires also.

We have an alarm bell located at the Electric Utility Company trouble office and they respond to all fires.

Cooperation between power companies and the Fire Department is excellent in this city, and I believe that the same can be obtained throughout the country by calling a conference between the executives of both departments and an agreement made.

Jos. Fifarek, Chief, Traverse City, Mich.: We are very fortunate to have our high tension lines clear, but on all general alarms we have a man report so as to clear up any trouble that we may get into.

In the case of a broken overhead wire, we carry cutters and gloves with us at all times, and cut wires to insure safety to everyone. When the lineman arrives he takes charge of the lines.

We get splendid cooperation at all times from our local power companies.

George Rosenberger, Chief, Alexandria, Ind.: When I find that I am hampered by high tension wires at a fire, I call the dispatcher of the Indiana Railroad Company or the electrician at the sub-station of the Indiana General Service Company. They in turn will have the current cut off. For broken wires, I use the same procedure. I have no suggestions to make regarding the cooperation given by these companies.

Karl R. Adams, Chief, Alma, Mich.: When we are hampered by high tension wires at a fire we call the Power Company and have the current shut-oñ. Sometimes we are able to cut wires or pull fuse plugs at the transformer.

When we are troubled with broken wires we cut them at the poles so as not to have any live wires on the ground or in the air.

The Consumers Power Company have always cooperated to the fullest extent in doing whatever was necessary at a fire.

Wright Hedges, Chief, Atlantic, Iowa: We have two electricians in our department and the city electrician attends all fires. High tension or any other wires that are dangerous are cut.

Ours is a municipal plant and we have no trouble whatsoever insofar as cooperation is concerned. Common sense will in the majority of cases solve the problem of cooperation between a Fire Department and an electric company.

* * *

ANSWERS TO PREVIOUS QUESTIONS

The following reply is in answer to a previous question on suggestions in designing a fire station:

T. T. Bixler, Chief, Spencer, Ind.: I believe if I were building a fire station for our town I would build sleeping quarters and a lounge room on the second floor, nothing on the first floor except for the equipment.

I would not let the fire station be used for a community center or for a police station. I do not believe it is a wise plan.

* * *

The following replies are in answer to a question on methods employed in thawing out frozen hydrants and the equipment that is used for this work:

J. E. Held, Chief, Alliance, Ohio: We are not troubled to any extent with frozen hydrants as they are inspected regularly for leakage and when one is found it is repaired immediately.

When a hydrant is found frozen, it is first thawed out and then inspected to find the reason for it being frozen, and it is then corrected by replacement of defective parts. This fault is mostly found to be in the drain valves. All working parts are oiled at least twice a year.

We are equipped with an attachment to the exhaust pipe on motor apparatus for thawing out hydrants. We find this to be very satisfactory.

Marven S. Morgan, Chief, Faribault, Minn.: We are not troubled with frozen hydrants in Faribault. Everytime a hydrant is used we report it to the Water Department and they go and see that it is properly drained. If I do find one that does not work right I report it to the Water Department and they take care of it.

J. L. Murphy, Chief, Kingston, N. J.: Hydrants are cared for in our city by the Water Department. They have men testing hydrants continuously during the winter months to prevent freezing. This plan has worked out satisfactorily in Kingston. I get whole-hearted cooperation from the Superintendent of Water Department and the Board of Water Commissioners. If I see the need for a new hydrant installation or an old hydrant changed from one location to another, I recommend the change and the recommendation is always carried out by the Board.

J. Gibson, Chief, Mount Vernon, N. Y.: We have not been troubled with frozen hydrants in years, in fact not since the water system has been under city supervision.

Would state that the cooperation of the Water Departments is of the best, and they have kept hydrants in repair at all times.

We have the Ross thawing device and would advise that we have never had an occasion to use same, but it is kept in readiness at all times and answers all calls in the winter months.

THE FIGHTING OF FIRES WHICH INVOLVE CHEMICAL HAZARDS

Second of a Series Dealing with Such Fires — Garage, Motion Picture and Pyroxylin Plastic Fires

By LIONEL K. ARNOLD,
Assistant Chemical Engineer, Engineering Experiment Station, and
LINDON J. MURPHY,
Municipal Engineer, Engineering Extension Service, Iowa State College

For the accompanying article, the second installment of which is published herewith, FIRE ENGINEERING *is indebted to the Official Publication of the Iowa State College of Agriculture and Mechanic Arts, it being comprised in Bulletin No. 9, Engineering Extension Service:*

Garage and Filling Station Fires

THE presence of flammable liquids and the possibility of encountering explosive vapor mixtures make garage and filling station fires particularly hazardous when they have gained headway.

Danger points are: (1) the gasoline in car tanks; (2) wheeled service tanks of gasoline, oil or grease; (3) sulphuric acid in the battery charging room; (4) supplies of spray paints and body finish lacquers; (5) new and used tire storage; (6) acetylene generators or tanks; (7) supplies of alcohol; and (8) visible pump tanks. Large gasoline storage tanks are in practically every case buried safely underground, hence will not contribute to hazard from fire. Accumulations of gasoline vapor in empty portable service tanks, barrels or containers are perhaps the most serious of the intangible fire hazards. While open supplies of gasoline or oil will burn fiercely, the vapor of gasoline in empty containers of any sort will ignite with explosive violence.

Quick action is imperative in attacking a garage or filling station fire because of the flammable and explosive nature of the contents. Ventilate immediately and use water in volume. If available, foam will be very effective in extinguishing burning oil or gasoline. Water will usually do little damage in a garage and can be used in quantity to keep supplies of all kinds from igniting. Spare engine parts and other machined metal constitute the exception to this rule. They should be kept as dry as possible. Oils, greases and lacquers are often stored in quantity in small containers; if kept cool they will not rupture and burst into flame. Burning tires make a very hot fire with dense smoke. If it is apparent that the tire supply may be involved, a stream of water should be utilized to keep them cool and prevent burning.

Where acid carboys in the battery storage room are broken, foam or a strong stream of water may be used to dilute the acid. Likewise where heat may have cracked visible gasoline containers allowing the liquid to escape, foam will be effective, or a strong stream of water may be used to wash away the gasoline.

Salvage can be undertaken after the building has been thoroughly ventilated and after a number of strong streams have been directed at the heart of the fire. It may then be possible to roll out some of the cars and remove stores of tires and containers of flammable liquids.

Motion Picture Theatre Fires

Danger points in a motion picture theater fire are: (1) the projection booth; and (2) nitro-cellulose film.

The booth should be vented to the outside with an opening not less than 78 square inches, with draft maintained by an exhaust fan of at least 50 cu. ft. per minute capacity. With such a vent carrying off the heat and fumes from burning film the operator can usually extinguish the fire with a carbon tetrachloride or other extinguisher.

For fire in large quantities of film use water in volume. Water is very effective in extinguishing celluloid fires because it brings the temperature of the burning celluloid down below the point of decomposition.

Film when ignited and allowed to burn with a liberal supply of air, burns rapidly with a yellow flame and no smoke. If, however, the air supply is inadequate, it will decompose without flame, but with the evolution of an explosive gas, dense, and yellow in color, and with a characteristic acrid odor.

Pyroxylin Plastic Fires

Five-and-ten-cent stores and variety stores carry stocks of pyroxylin plastic articles which present a similar fire hazard. These articles include "celluloid," "fiberloid," "pyralin," "viscoloid," "zylonite" and similar products under various trade names. All are made of nitro-cellulose material.

The highly combustible nature of such products constitutes one of the serious hazards from fire. A second hazard is the explosiveness of the fumes thrown off by decomposing celluloid. A third is the danger to life from inhaling these fumes, which are poisonous.

A fire involving celluloid or "plastic" should be ventilated immediately and thoroughly. An abundance of water should be used to wet down the burning celluloid and surrounding stock.

(*To be continued*)

Fire Sweeps Lumber Yard in N. Y.

A three-alarm fire swept through the yard of the Long Island Mill and Lumber Company, Long Island City in Queens Borough, New York City. The flames endangered two nearby factories but the Fire Department succeeded in holding the fire to its point of origin.

The blaze was discovered by a lumber yard watchman at 3:20 a.m. When the first company arrived, the fire had spread to piles of lumber flanking the lumber mill. The second and third alarms were sounded immediately and brought eleven engine companies and four ladder companies. A searchlight unit also responded.

It is believed that the fire was started by a short circuit in an electric transformer near the mill.

Decisions on Employment of Firemen

(*Continued from page* 964)

heads of city governmental departments, in the matter of discharging or appointing an official or employee, cannot render the city responsible in any manner by reason of their wrongful acts. These officials and boards are, when so acting in the performance of the governmental functions, as distinguished from the proprietary functions, of the municipal corporation."

Liability of Public Officials

Notwithstanding the fact that a municipality, ordinarily, is not liable for wrongful discharge of a member of the Fire Department, yet the public officials, directly responsible for the discharge, may be personally liable if it is proved that they failed to use ordinary care to investigate the charges on which the discharge was based. The same is true with respect to a public official who becomes financially interested in a contract with the municipality with which he is employed, particularly if in doing so a law restricting the latter is violated.

Since considerable discussion has arisen from time to time whether or not a law is valid, by the terms of which public officials are restricted from becoming interested in contracts with the city, the recent case of York vs. State 158 S. E. 53, presents interesting law.

In this case it was shown that a state law provides:

"That no person holding office under any municipal corporation shall, during the time for which he was elected or appointed, be capable of contracting with such corporation for the performance of any work which is to be paid for out of the treasury, nor shall any person be capable of holding or having any interest in such contract, either by himself or by another, directly or indirectly."

A municipal employee was indicted for violating this law. He contended that the law was invalid but the higher Court held the law valid and enforceable, saying:

"Under the title of this act the General Assembly could confer upon the city authorities any power which the Constitution does not prohibit it from conferring upon a municipality, and could enact any provision for the conduct of its municipal officers."

A new fire station is to be erected in Monroe, Mich., to replace the present No. 2 Fire Station.

As the result of a fire that caused a $10,000 loss in New Kingston, Pa., the town was faced by a water shortage. All the wells and cisterns were drained to fight the fire.

FIRE DEPARTMENT ACTIVITIES

New fire apparatus has been delivered to Plymouth, Ind.

Valhalla, N. Y., has included in the budget of the Fire Department, $6,000 for the purchase of new fire apparatus.

Glenville, Conn., is to receive a 1,000-gallon pumper instead of a 750-gallon pumper as was originally planned.

The fire alarm system of Erie, Pa., is to be extended so that it will be in operation early this spring.

A 750-gallon pumper equipped with a 400-gallon water tank has been delivered to Riviera Beach, Del.

Bids have been invited in Beverley Hills, Cal., for the construction of a new Fire Department headquarters.

Funds are being raised in Wisdom, Mont., for the purchase of fire apparatus.

Included in the Fire Department budget for Lowell, Mass., is provision for the purchase of new fire apparatus.

Lawrence, Kan., has voted for the purchase of a 750-gallon pumper.

A new fire alarm system is to be installed in Michigan, N. D., to replace the present bell system.

Sycamore, Ohio, has purchased Howe fire apparatus mounted on a Reo truck.

Bids have been invited in Waterloo, Ia., for a new automobile for the use of Chief Ray Tiller in responding to fires.

Construction is being rushed on the new fire station for Klamath Falls, Ore. The building will cost $30,000 and will contain many conveniences for the men.

Work has been started on the erection of a new fire station for Seattle, Wash. The new house will replace one that has been in service for more than twenty years.

Chief Ross B. Davis, Philadelphia, Pa., addressed a meeting of the Ocean County Firemen's Association held in Ocean Gate, N. J.

A Volunteer Fire Department has been organized in Montandon, Pa. The department, at present, consists of seventy-five men.

Cathlamet, Wash, is considering the formation of a volunteer Fire Department. The move is being sponsored by the Cathlamet Commercial Club.

Members of the Mitchell, S. D., department are urging the purchase of a new pumper to replace one that has been in service for twelve years.

Henry Gruninger, Acting Chief of the Fire Department in Medina, Ohio, died in a local hospital at the age of fifty-three. He was injured by a fall into a concrete tank.

Tentative plans have been submitted to Chief Taylor of Cheyenne, Wyo., for the rearrangement of the fire alarm system.

Neche, N. D., is considering the formation of a volunteer Fire Department. The move is being sponsored by the local Lions Club.

Mt. Vernon, N. Y., is considering the erection of a new fire station. The improvement is being delayed because of dispute concerning the purchase of the station site.

Salt Lake City, Utah, will subject all members of the Fire Department to an oral examination conducted by the Civil Service Commission.

Ten additional American Legion posts in Wisconsin have organized volunteer fire-fighting groups to cooperate with the State Conservation Commission to fight forest fires.

Iowa State College and the city of Ames, Ia., will jointly maintain a fire station in West Ames, following the approval of the plan by the State Board of Education.

Requests for the purchase of two new pieces of fire apparatus, a 1,000-gallon pumper and a combination chemical and hose wagon, have been included in the 1932 budget for Bridgeport, Conn.

A new fire station has been completed in Magnolia, Mass. The house was opened for inspection of the school children and they were served ice cream and cake. A party was held in the evening at which there were dancing and refreshments.

Plans have been drawn for a new fire station to be erected in Stockton, Cal. The building is estimated to cost $40,000. It will be two stories high and on the second floor will be accommodations for twenty-eight men.

Members of the Southwestern Washington Firemen's Association, at their monthly meeting which was held in Olympia, Wash., discussed the protection of rural communities. Chief Trease of Raymond is President of the association.

Harrisburg, Pa., has received one hundred applications for sixteen vacancies in the Fire Department. The positions are the result of the two-platoon system for fire apparatus drivers in accordance with the state law passed last spring.

The City Commission of Newark, N. J., voted to make repairs on thirty-three fire stations and the fire alarm system at an estimated cost of $260,000. The work is part of the unemployment relief program.

The Board of Control of Alliance, Ohio, is considering the purchase of new fire apparatus. Members of this board have visited a number of nearby Fire Departments to inspect their apparatus.

A school for firemen was conducted in Burlington, Ia., by Capt. H. E. Jurgensen of the Iowa Inspection Bureau. Inspection trips were held in the afternoon to a number of industrial plants and the lectures were given in the evening.

Bids have been received in Leavenworth, Kan., for the proposed Fire Department machine shop which is to be installed in the rear of the No. 2 Fire Station in South Leavenworth.

Manitowac, Wis., refused to subscribe to the Mutual Aid Plan because of the liability which the city might assume in joining other Wisconsin cities in a mutual fire protection plan.

The city council of East Orange, N. J., has approved the recommendation that a central office fire-alarm system be installed in the new headquarters building at a cost of $35,000. Several improvements over the present system will be provided.

At the coming convention of the Michigan State Firemen's Association which will be held in Grand Rapids, Mich, June 14 to 16, the men will be asked to consider a proposal that a delegate from each city unit in the state attend school once a year.

Luverne fire apparatus has been delivered to the following municipalities: 300-gallon pumper with booster tank to Eldora, Ia.; 500-gallon pumper with booster tank on a Reo chassis to Campbellsport, Wis.; 300-gallon pumper with booster tank on a Pierce Arrow chassis to Winona, Minn.

Chief Clarence H. Dougal of Livingston, N. J., has been re-elected Chief for the fourth consecutive year. He is at the present time organizing a rescue and salvage squad. A physician trained the firemen in first aid work and a number of the firemen are now holders of American Red Cross certificates.

As a fire preventative measure, Chiefs of Battalions in the New York Fire Department have been ordered to direct company commanders to make daily inspections of both large and small department stores. The inspections continued practically throughout the month of December and in order to check up on the inspections, large stores have been inspected by Deputy and Battalion Chiefs.

A new fire alarm system for Salem, Ore., has been recommended by engineers of the National Board of Fire Underwriters. Other important recommendations are that the appointment of all members of the department be made in accordance with Civil Service regulations. The purchase of additional equipment has been recommended and the employment of more firemen so as to increase the company strength to at least six men per company in the day and at least eight men per company at night.

The Tax Survey Commission of New Jersey in a report recently issued stated that New Jersey municipalities can save millions of dollars for taxpayers in reduced costs of fire protection services and lower fire insurance rates, and at the same time increase the efficiency of safeguards against the fire menace. The report states that there is a multiplication of fire-fighting units and overmanning in Newark, Jersey City and some other communities. The fire loss per capita in New Jersey last year was $4.31 while the national average was $3.26.

PROPOSED IMPROVEMENTS

Reedley, Calif.—City Council authorized fire committee to investigate possibility of purchasing pumper for fire department, according to reports.

Weiser, Idaho—Reports state city council considering purchase of combination hose and chemical car.

Elwood, Ind.—Movement under way to secure fire protection for rural section within seven miles radius of city.

Ukiah, Calif.—City council planned fire alarm system improvements, according to reports. J. R. Thomas, Mayor.

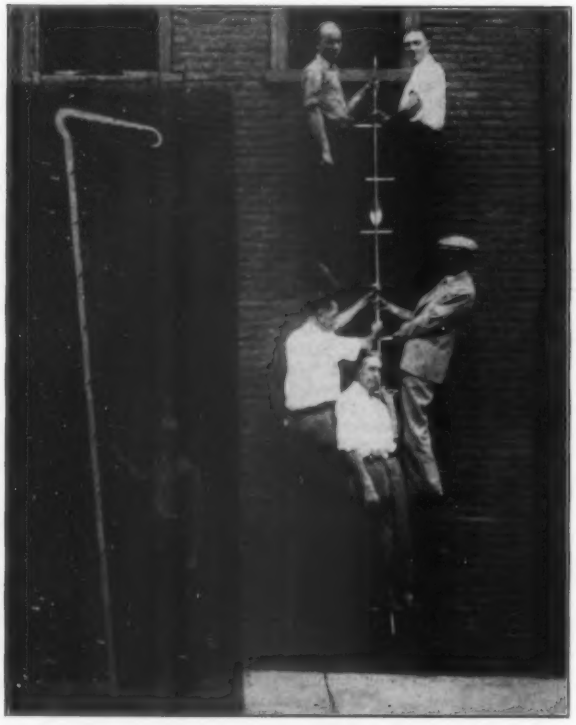
Hillsdale, Mich.—City Council voted to purchase new piece of fire apparatus at cost of $10,300.

The Dalles, Oregon—Consideration being given to recommendation of fire department for purchase of 1,000 gal. pumper after recent large fire.

Metal Scaling Ladders on Market

By the use of metal in the construction of a 12-foot Pompier ladder, the Metallurgical Laboratories, Inc., of Philadelphia, has produced a ladder that weighs only seventeen pounds. The ordinary Pompier ladder of the same length weighs twenty-seven pounds. The metal ladder has resulted in a saving of thirty-seven per cent in weight.

The new ladder is entirely of steel and embodies some of the recent developments in aircraft construction. The rails and rungs are made of high grade alloy steel seamless tubing,



New All Steel Pompier Ladder

The photograph shows the metal ladder supporting a weight of 750 pounds. A side view of the ladder is shown in the insert.

elliptical in shape. The rungs are passed completely through the rail and are fixed in position by autogenous welding. The ends of the rungs are closed and turned up to prevent slipping. The hook is an alloy steel forging.

The company is now working on the design of metal two-rail ladders including the folding hook type of ladder.

Recommendations have been made that Clinton, N. Y., fire district purchase a 400-gallon pumper provided with a booster tank.

Plans are being made by the volunteer departments of Delaware for the twelfth annual convention of the State Firemen's Association which will be held in Wilmington, September 21 and 22.

Chief Davis Opposes Budget Cut

Chief Ross B. Davis, of Philadelphia, Pa., pointed out some of the things which the city must face if the City Council makes any serious cut in the budget for the Fire Department. The items listed are:

An increase of perhaps ten or fifteen per cent in fire insurance rates.

Dangerous curtailment of the fire-fighting service of the city.

Closing of some fire stations and the inability to open several new houses that are now greatly needed.

Continued operation of old equipment which should be replaced.

Increased hazards to life and property and the possibility that the city will fall below the standards of the National Board of Fire Underwriters.

Chief Davis said, "For the last four years Philadelphia has held the enviable record of having the lowest fire loss in the United States. That, during the last year, has been upheld under the handicaps imposed by a budget cut previously made. The new cut will undoubtedly mean the woeful under-equipping and under-manning of the department to an extent where it will not be able to function with anything near its present efficiency.

"We are below the required margin for safety. We have houses, recently constructed and sorely needed, for which we have no men."

Changes in Design of Extinguisher

A new model one-gallon portable fire extinguisher has been announced by the Pyrene Manufacturing Company. The operating valve on the model is at the back when the extinguisher hangs on the wall. The liquid gauge and the air pressure gauge is located in front so that the extinguisher may be more readily inspected. The extinguisher can be discharged in fifty-five seconds.

Newly Elected Chiefs

The following have been elected to head the Fire Departments in their respective municipalities:

Fall City, Ore.—H. S. Zimmerman.
Arlington, Md.—Albert E. Scheffel.
Medina, Ohio—Henry Gruninger.
Winona Lake, Ind.—C. L. Faris.
Lincoln, Cal.—E. M. Vorous.
Warren Point, N. J.—Ray De Kezel.
Lavallette, N. J.—Charles Brackman.
North Bellmore, N. Y.—Clement Westerman.

CONVENTION DATES

Jan 8, 1932—FIRE CHIEFS' COUNCIL OF NASSAU COUNTY, N. Y. Next meeting, Garden City, L. I., N. Y. President, Chief George Maier, Long Beach, L. I.

Jan. 20, 1932—FIRE CHIEFS' EMERGENCY PLAN OF WESTCHESTER COUNTY, N. Y. Regular Meeting, Fire Headquarters, Chappaqua, N. Y. Secretary-Treasurer, Lieut. E. Riviere, Fire Headquarters, Larchmont, N. Y.

Jan. 23-24, 1932—SOUTHERN CALIFORNIA FIRE CHIEFS' CLUB. Next meeting, Island of Catalina, Cal. Secretary-Treasurer, Charles E. Smith, Chula Vista, Cal.

May 9-12, 1932—NATIONAL FIRE PROTECTION ASSOCIATION. 36th Annual Meeting, Atlantic City, N. J. Managing Director, Franklin H. Wentworth, 60 Batterymarch St., Boston, Mass.

May 11, 1932—DEL-MAR-VA VOLUNTEER FIREMEN'S ASSOCIATION. 3rd Annual Convention, Cape Charles, Va. Secretary, W. A. Karpa, Cape Charles, Va.

May 19, 1932—IOWA FIRE CHIEFS' ASSOCIATION. Annual Convention, Ames, Ia. Secretary-Treasurer, Chief L. R. Morris, Ames.

June, 1932—NORTHWESTERN OHIO VOLUNTEER FIREMEN'S ASSOCIATION, 60th Annual Convention, Gibsonburg, Ohio (exact date to be decided later). Secretary, Harry Smith, Supt., Water Works, Port Clinton, Ohio.

June 21-24, 1932—ILLINOIS FIRE COLLEGE, 8th Annual College, University of Illinois, Champaign-Urbana, Ill. Director, Prof. L. H. Provine; Secretary, Asst. Chief Roy W. Alsip, Fire Department, Champaign, Ill.

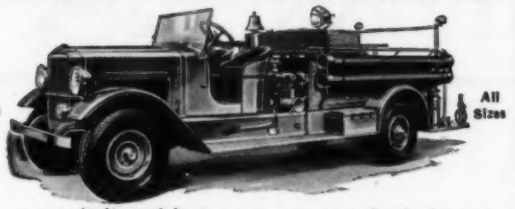
June 21-24, 1932—NEW ENGLAND ASSOCIATION OF FIRE CHIEFS, 10th annual convention, Newport, R. I. Secretary, Chief John W. O'Hearn, Watertown, Mass.

Aug., 1932—VIRGINIA STATE FIREMEN'S ASSOCIATION. 46th Annual Convention, Alexandria, Va. (Exact date to be determined later.) Secretary, O. W. Dabney, Staunton, Va.

Aug. 2-4, 1932—INDIANA FIREMEN'S ASSOCIATION. 16th Annual Convention, Columbus, Ind. Secretary, Clem Smith, Post Office Box 520, Terre Haute, Ind.

Sept. 21-22, 1932—NEW CASTLE COUNTY FIREMEN'S ASSOCIATION. Annual Convention, Wilmington, Del.

MAXIM FIRE APPARATUS



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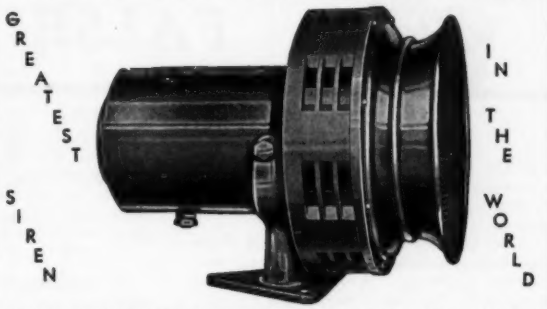

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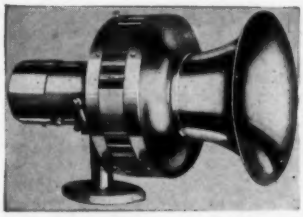

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FALSE ALARMS

LIGHT FROST

Early Sunday morning a fire engine was dashing down a wide street, and at that hour the road was almost deserted.

With whistle blowing and bell ringing, the apparatus approached an important crossing. A large truck had stopped to let the firemen go by and a moment afterwards a little Austin passed out from behind the truck and almost into the path of the fire apparatus. The engine made a quick swerve and so did the Austin with the result that the two cars merely sideswiped each other slightly. As both were traveling at about the same speed in the same direction, little damage was done.

Both machines stopped. A quick check-up was made. No one was shaken off the fire apparatus and no one was hurt in the other machine. In a moment the fire apparatus was on its way again.

"That was a close one," remarked the officer.

"You bet," answered the driver. "I thought the last frost had killed off all them things."

Opportunity only knocks once and then the installment collector does the rest.

WELL HEELED

A visitor to this office tells of an incident in his department. A friendly game on the second floor of the station was suddenly broken up by the accusation:

"Look here, you're cheating."

"I am not," said the other. "I had that ace long before the game began."

Nowadays a company is known by the men it keeps.

EXPLAINED

The Fire Marshal contended that a local business man set fire to his place to collect the insurance. The defendant's lawyer became very much excited during the course of the trial.

"You're a cheat," he said to the City Attorney.

"You're a liar," said the Attorney.

Said the Judge, "Now that these parties have identified each other, we will proceed with the case."

She thinks a postage stamp is a dance. Well letter.

VISIBLE PROOF

The Chief and a fellow who was slated for an important post grew up together in the same time. Naturally when a committee wished information concerning the ambitious young man, they came to Chief. He was asked if the fellow was truthful.

"Well," said the Chief, "I wouldn't say that Jim was untruthful. I don't know that I would go so far as to say that, but I'll tell you this much. When feeding time used to come around when he used to be on the farm, his pigs wouldn't stir until he got someone else to call them for him."

A bachelor's life is just one undarned thing after another.

HE WON

A very large crowd attended the informal party at the fire station. These informal gatherings which were held on the average, once a month, soon became very popular.

But Joe was the life of the party, and a friend who had worked hard for this honor was very much put out that he wasn't the favored one.

"Well, why shouldn't Joe be the life of the party," he explained to his wife. "He was the only one who could talk louder than the radio."

TOO TRUE

According to a newspaper item: "The bride was gowned in white lace. The bridesmaids' gowns were punk. The whole color scheme of the decorations was punk."

IMPORTANT FACT

The Fire Marshal tried to prove the defendant set fire to his house to collect insurance. The man's defense was that he was making home brew, and that the gas stove set fire to some curtains and then to his home. The trial was a most important one, and the District Attorney made an inspiring speech, and then the Judge, after charging the jury, said:

"Is there any question that any one would like to ask before considering the evidence?"

One juror said, "A couple of us would like to know if the defendant boiled the malt one or two hours, and how does he keep the yeast out?"

HE KNEW

A new grocery clerk started work Monday morning. One of the boys at the station discovered the fact, and soon there was a constant trek to the grocery for impossible articles of commerce. After a number of these purchases, the boy soon became hardened to the pranks.

A lady came in and asked for a package of bird seed.

The new clerk said, "You can't fool me, lady. Birds come from eggs, not seeds."

WELL ACQUAINTED

The Chief was well known in a number of nearby communities. He was asked to address a meeting of the volunteer firemen in an adjoining village, and before the meeting, he was the dinner guest of the Fire Commissioner.

The hostess asked her guest, "Have some more pudding, Chief?"

And the Chief to be polite answered, "Awfully good—just another mouthful."

Addressing her husband, the hostess said, "Robert, fill up the Chief's plate."

One trouble with deep-breathing exercises is that people who take them use the extra breath to tell about it.

DISAPPOINTING

"Our business, madam," explained the ranger to the city vacationist to the big woods, "is to go about, day after day, looking for forest fires."

"And I suppose you find a great many," exclaimed the lady, very much interested in the ranger's work.

"No. Just one or two a season."

"Mercy!" said the lady. "I should think you'd get terribly discouraged."

—Drawing by "Art Espey

Santa Claus: "Phew! Guess I'll leave a subscription to Fire Engineering for these folk. Then they'll find out how to keep that chimney clean for such fellers as I."

YOUR CATALOG PAGE

Fire Protection Equipment and Supplies

1 Acid Siphons.
2 Adaptors for Changing Hydrant Threads.
3 Acid Jars and Rings.
4 Aerial Ladders, Detachable.
5 Aerial Trucks.
6 Alarms, Siren, Electric.
7 Alarm Systems, Industrial.
8 Alarm Systems, Municipal Telegraphic.
9 Alarms, Thermostatic.
10 Asbestos Clothing.
11 Badges, Insignias, Buttons, etc.
12 Banners, Trumpets, etc.
13 Battery Jars.
14 Battery Zincs for Fire Alarm Batteries.
15 Bells, Fire Alarm, Municipal
16 Body Equipments.
17 Boxes, Gongs, Reels, Registers, Fire Alarm.
18 Brakes, Air.
19 Brake Linings.
20 Brooms, Fire.
21 Building Materials, Fire Retardant.
22 Caps, Firemen's.
23 Chains, Non-Skid Fire Apparatus.
24 Chassis for Fire Apparatus.
25 Chemical Engines and Tanks.
26 Chimney Fire Fusees & Compounds
27 City Service Trucks.
28 Coats & Suits, Firemen's Quick Hitch.
29 Combination Chemical & Hose Cars.
30 Cutting & Welding Equipment Blow Torch.
31 Cutting & Welding Equipment, Electric.
32 Deluge Sets.
33 Door Openers, Fire Station, Automatic.
34 Extinguishers, Calcium Chloride.
35 Extinguishers, Carbon Dioxide.
36 Extinguishers, Soda-Acid
37 Extinguishers, Carbon Tetrachloride.
38 Extinguishers, Foam.
39 Extinguishers, Powder.
40 Fire Boat Nozzle Equipment.
41 Fire Department Supplies, General.
42 Fire Exit Devices, Door Opening.
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45 Fire Escapes, Rigid.
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48 Flashlights, Hand.
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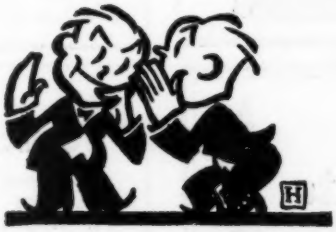
50 Foam Liquid for Extinguishers.
51 Gas Masks and Respirators.
52 Gas & Smoke Helmets.
53 Goggles, Firemen's.
54 Helmets, Metal, etc.
55 Hose Carts, Reels & Racks.
56 Hose Clamps.
57 Hose, Fire.
58 Hose, Chemical.
59 Hose Holders.
60 Hose Jackets.
61 Hose Standardization Tools.
62 Hydrant Draining Pumps.
63 Hydrants, Fire.
64 Jacks for Fire Trucks.
65 Jacks, Shoring & Prying.
66 Ladders, Fire.
67 Lightning Arresters.
68 Motorcycles, Fire Dept. Equipped.
69 Nets, Life.
70 Nozzles, Pipes & Misc. Brass Goods.
71 Packings, Pumps.
72 Pads, Pole Hole.
73 Paints, Fire Resisting.
74 Priming Ether, Motor.
75 Pumping Cars, Standard.
76 Pumping Cars, Foam.
77 Pumps, Fire Apparatus.
78 Pumps, Fire Service, Stationary.
79 Pumps, Portable for Fire Protection.
80 Record Books, Fire.
81 Relief Valves.
82 Reviving Apparatus, Oxygen.
83 Rubber Clothing.
84 Salvage Covers.
85 Searchlights.
86 Shingles, Fire Retardant.
87 Shirts, Firemen's Special.
88 Sirens, Apparatus & Chiefs' Cars.
89 Sliding Poles.
90 Soda & Acid Chemicals.
91 Spark Plugs, Fire Apparatus & Motorcycles.
92 Squad and other Auxiliary Cars.
93 Sprinkler Head Shut-Offs.
94 Sprinkler Supervisory Service.
95 Sprinkler Systems, Automatic, Foam.
96 Sprinkler Systems, Automatic, Water.
97 Steam Fire Engines.
98 Syphons, Water.
99 Tarpaulins & Fire Blankets.
100 Tetrachloride Chemicals.
101 Thawing Equipment, Hydrant.
102 Tires, Fire Apparatus, Pneumatic, Solid, Cushion and Non-Skid.
103 Tractors.
104 Traffic Clearing Systems.
105 Triple Combination Pumping Cars
106 Uniforms.
107 Water Towers.
108 Wheels, Cushion.
109 Whistles, Fire Alarm, Compressed Air.
110 Whistles, Fire Alarm, Steam.
111 Whistles, Fire Apparatus.
112 Wrecking Trucks.



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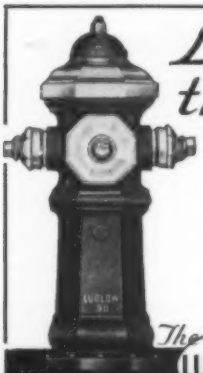
As a fire protection official I should like to have descriptive literature and complete information mailed to me, without cost or obligation, on the equipment indicated by the following numbers:

Nos. .....
Nos. .....
Nos. .....
Nos. .....

Name .....
Position .....
Street .....
City and State .....

For Information on Any Equipment Not Listed, Write on This Page or Use Separate Sheet

12-23



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self-illuminating hydrant

Write for new descriptive folder—free to any interested official.

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Single and Double Jacket Hose

Manufactured by
HEWITT - GUTTA PERCHA
RUBBER CORPORATION
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Chiefs Recommend

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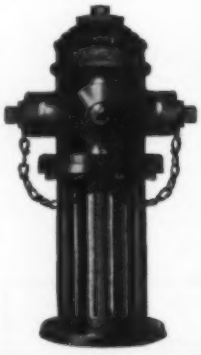
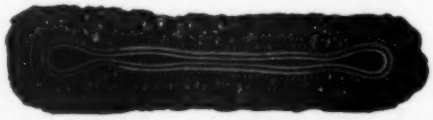
FIRE HYDRANTS

BECAUSE: they are designed with the special features a fire department wants. Whenever you specify new hydrants be sure to have our folder in your files under Hydrants. This folder is for any chief who wants to recommend a hydrant that is built right. Send for folder and always recommend the CRISPIN.



MULTIPLEX MFG. CO.
BERWICK, PA.
Offices: 165 B'way, New York City
Plant: Berwick, Pa.

Bi-Lateral Fire Hose



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G

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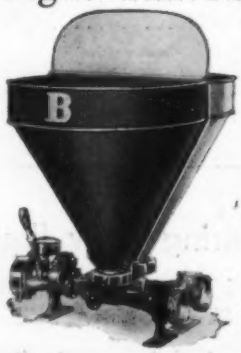

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ESTABLISHED 1907

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SAND SPUN (centrifugally cast) and PIT CAST
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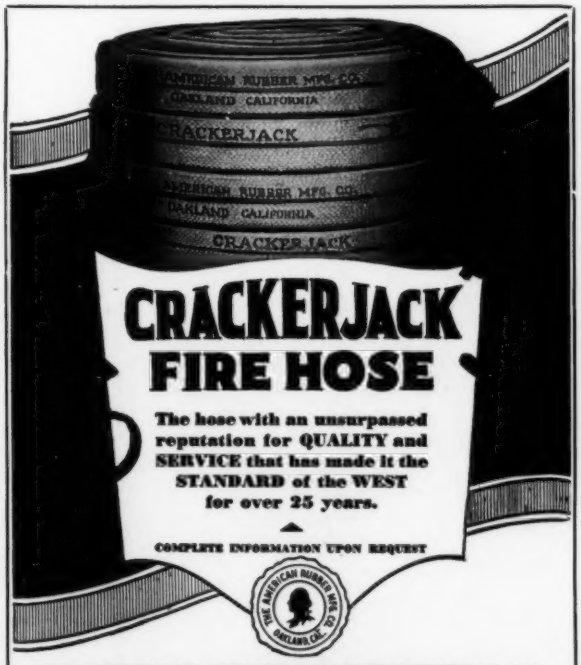

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